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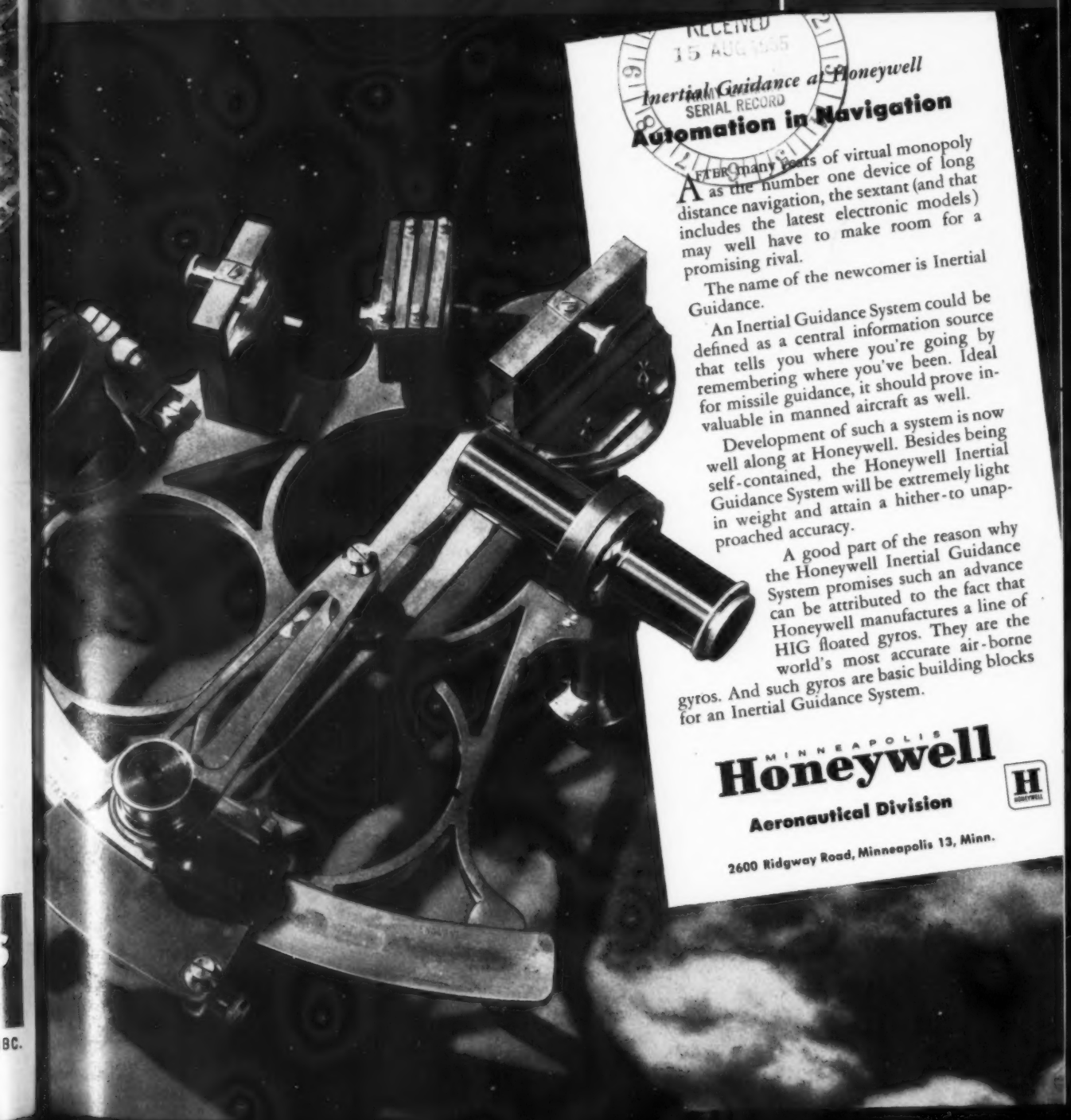

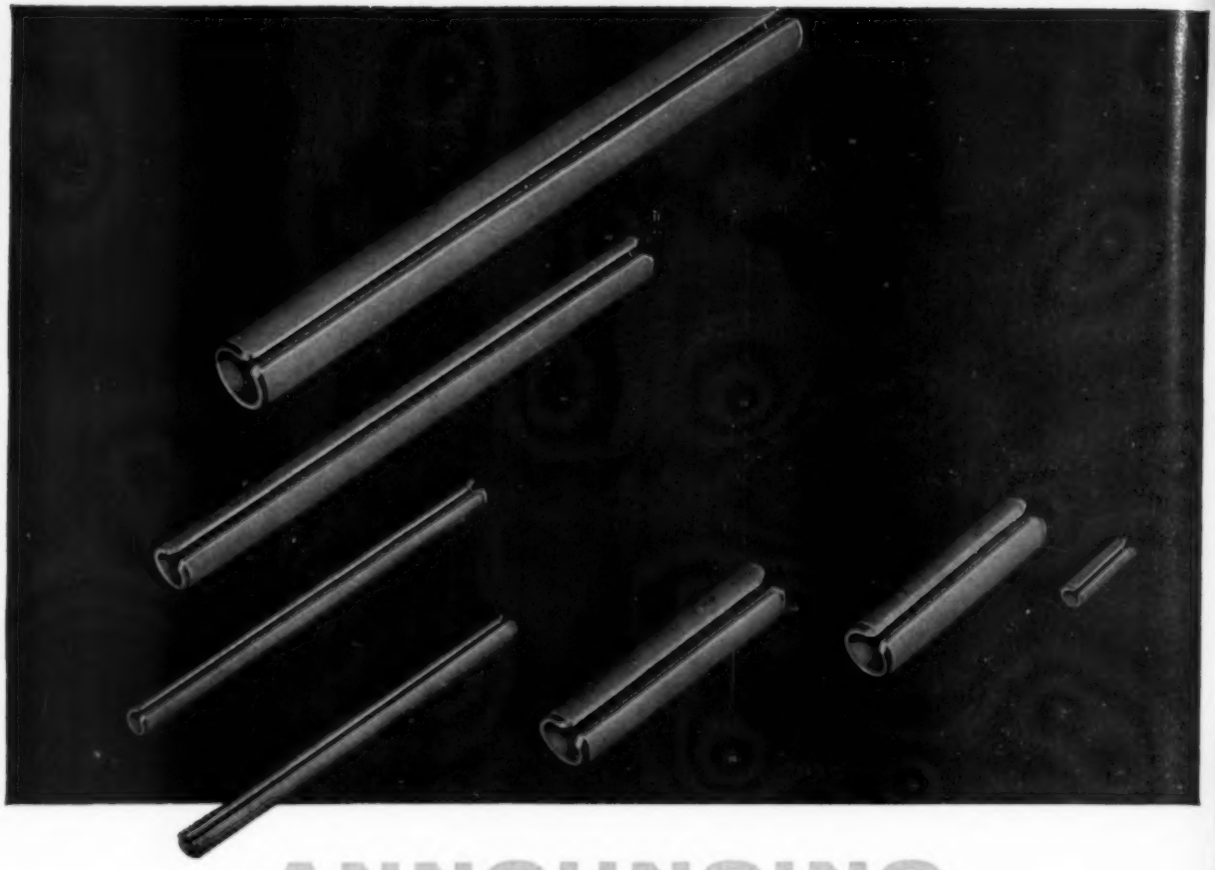

ANNOUNCING...

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Strong . . . highly resistant to corrosion . . . nonmagnetic . . . extremely conductive

Now you can use Rollpin to cut assembly and maintenance costs in a whole new group of applications. A new line made of beryllium copper, one of the strongest of the copper base alloys, opens the door to a wide variety of uses where resistance to corrosive attack, good electrical properties and other unusual characteristics are required. These slotted tubular copper spring-pins can be used in assemblies that range from plumbing fixtures to electrical instruments, particularly in conjunction with other copper base alloy components.

Rollpin has already established its ability to replace taper pins, straight pins and set screws; to serve as a rivet, dowel, hinge pin, cotter pin or stop pin . . . eliminating special machining, tapping and the need for hole reaming or precision tolerances. Driven into a hole drilled to normal production standards, it locks securely in place, yet can be readily drifted out and reused whenever necessary.

Rollpin is available in beryllium copper from .062″-diameter to .250″-diameter, and in steel and stainless steel up to .500″-diameter.

ELASTIC STOP NUT (ESNA) **CORPORATION OF AMERICA**

Dept. R35-873, Elastic Stop Nut Corporation of America
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Please send me the following free fastening information:

☐ Data on beryllium copper Rollpin

☐ Here is a drawing of our product. What self-locking fastener would you suggest?

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INDUSTRY AIDS FOR THE ASKING

Useful literature, films, etc. on a variety of technical and engineering subjects . . . free unless otherwise noted.

HERMETIC SEALS. A four-page bulletin issued by Advanced Vacuum Products Inc. describes and illustrates Advac ceramic-to-metal hermetic seals made by this company.

Circle No. 100 on Reader Service Card.

ELECTRON MICROSCOPES. The Research and Control Instruments Division, North American Philips Co. has published an eight-page booklet titled "Questions and Answers on Electron Microscopes."

Circle No. 101 on Reader Service Card.

FLAME PHOTOMETER. A four-page folder that gives design data on the new Norelco flame photometer, Type 12130, may be obtained from the Research and Control Instruments Division, North American Philips Co.

Circle No. 102 on Reader Service Card.

HEATER CYCLING CONTROL. Barber-Colman Co. has issued a bulletin (F7221) that describes an automatic heater cycling control for the Aero Commander.

Circle No. 103 on Reader Service Card.

VENTURI INSERT NOZZLES. A four-page bulletin that gives technical data for uses of Venturi insert nozzles, designed for metering liquid, steam, air or gas, has been issued by Builders-Providence, Inc., Division of B-I-F Industries.

Circle No. 104 on Reader Service Card.

FLEXIBLE HOSE. A new set of bulletins describing and illustrating the design, installation and uses of flexible hose in dust and fume control, air-conditioning and materials handling has been issued by the Flexaust Co., formerly the American Ventilating Hose Co.

Circle No. 105 on Reader Service Card.

BUTYRATE. Eastman Chemical Products, Inc. has published a 44-page heavy-paper "work-book" containing the latest information on the use of "half-second" butyrate for people who formulate and sell lacquers.

Circle No. 106 on Reader Service Card.

NOISE MEASUREMENT AND CONTROL. Detailed information on noise measurement and control is presented in a 17-page booklet published by H. H. Scott, Inc. Prepared by Victor H. Pomper it discusses instrumentation, measurement, analysis and control.

Circle No. 107 on Reader Service Card.

ULTRASONIC CLEANING EQUIPMENT. A description of applications of the Acoustica Model DR-400 ultrasonic cleaning equipment in the aircraft and other industries is given in a two-page bulletin issued by Acoustica Associates, Inc.

Circle No. 108 on Reader Service Card.

GEAR TRAIN-CONTROL MOTORS. A four-page bulletin containing availability data on gear train-control motor combinations, published by Transicoil Corp., provides useful information for servo system designers.

Circle No. 109 on Reader Service Card.

RADAR AND MISSILE POWER SUPPLIES. Perkin Engineering Corp. has issued a bulletin (RMPS-854) titled "Radar and Missile Power Supplies," which illustrates and describes applications of low-voltage, high-current tubeless magnetic amplifier regulated types of power supplies for ground and airborne missile and radar applications.

Circle No. 110 on Reader Service Card.

POWER-MOTOR-GEAR TRAIN. A catalog sheet illustrating and describing the power-motor-gear-train made by the John Oster Manufacturing Co. includes dimensional drawings, performance features and a table giving motor length, gear-train length and related data.

Circle No. 111 on Reader Service Card.

CLEANING AND FINISHING. American Wheelabrator & Equipment Corp. has published a quarterly brochure dealing with precision cleaning and finishing that includes a discussion of the wet abrasive blast cleaning process and its applications.

Circle No. 112 on Reader Service Card.

TURRET PRESS. A bulletin describing the new Wiedemann RA-4P turret punch press for punching holes in printed wiring boards has been issued by the Wiedemann Machine Co.

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Additional Information Wanted_____

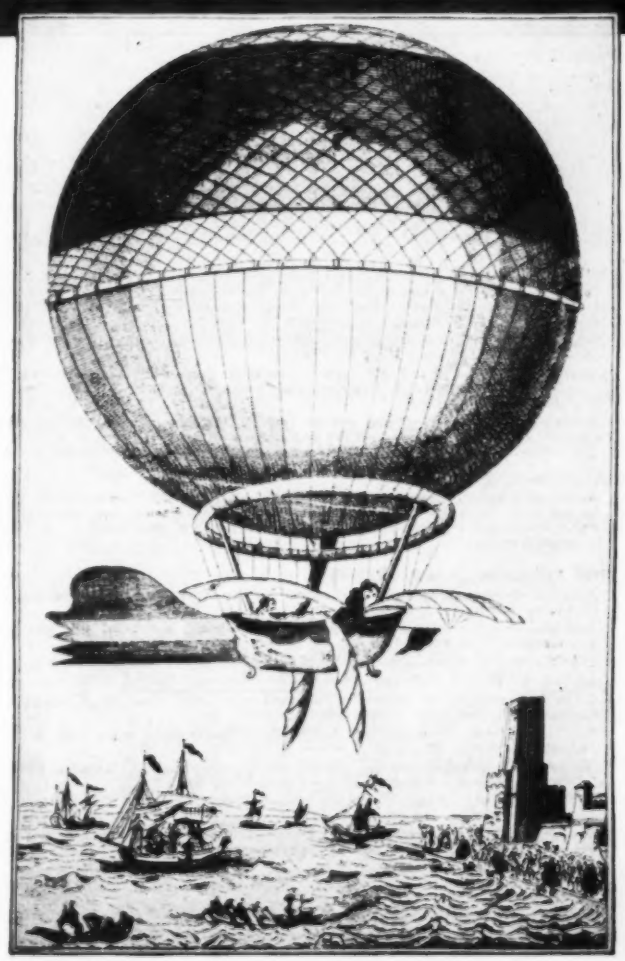
First Flight over the English Channel

"The borderline of nations is crossed in the Air! . . . The seas are no longer barriers!" This was the exciting news on January 7, 1785, when Jean Pierre Blanchard, French aeronaut, and Dr. John Jeffries, American from Boston, made the daring and hazardous first air journey across the English Channel by balloon.

As the huge gas-filled sphere rose over the cliffs of Dover, sightseers crowded the coast, as well as boats off shore, to watch this first air venture over the sea. All went well until Blanchard and Jeffries were in sight of the French coast. With one quarter of the gas lost, they began to fall fast.

In short order they threw into the sea everything from sand ballast to apples and biscuits. "Still approaching the sea, we began to strip ourselves," Jeffries reported later. Not until even Blanchard's trousers went overboard did the balloon ascend. After two hours in the air Blanchard and Jeffries landed near Calais, where they received a royal ovation.

Less than two centuries later, aircraft span the globe. And ESSO research is part of that progress, helping to supply aircraft and engine builders, operators and pilots with the new and better aviation petroleum products they need.



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OTHER PUBLICATIONS AND SERVICES

American Aviation Daily: Daily news service for the entire industry. $200 per year. Managing Editor—Keith Saunders.

American Aviation World-Wide Directory: Twice-yearly listing of products, people, and organizations. $7.50 each. Managing Editor—Marion E. Grambow.

Official Airline Guide: Monthly publication of airline schedules, fares. World-Wide Edition: $19.50 per year, everywhere. North American Edition: $13.50 per year in USA; $14.00 in Canada; $15.00 elsewhere. Published from 139 N. Clark St., Chicago 2, Ill. Phone: Central 6-5804. Managing Editor—Robert Parrish.

Air Traffic News (Incorporating Air Traffic Digest): Daily rates and tariff news. $175 per year. Managing Editor—Mary Miller.

Airports: Weekly newsletter for airport officials suppliers, and services. Airmailed every Friday. $25 per year. Managing Editor—Lois C. Philmus.

Air Information Division: 595 Broad Avenue, Ridgefield, N. J. Phone: Morsemere 6-8850. Director—Edward H. Henkler.

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new turbo-prop VISCOUNTS now flying for Capital Airlines

... from Washington, Chicago, Pittsburgh and Norfolk

MR. J. H. CARMICHAEL, *President of Capital Airlines,* says: "The Vickers Viscount will mean better operating economy and it will appeal to passengers by offering increased flying comfort. It is flexible enough to operate our long-haul and short-haul routes, and attractive enough to take passengers away from our long-haul competitors. No other existing transport plane meets these specifications, but the Viscount meets both tests."

Wherever the Viscount flies ... traffic figures rise!

Proof of this statement is again to be demonstrated on Capital Airlines Washington-Chicago route. Capital's purchase of 60 Viscounts is soundly based on the proved superiority of the world's first turbo-prop airliner—in terms of passenger preference, speed, economy and profit.

Here are some of the achievements reported by leading airlines as a direct result of putting Viscounts into service: Trans-Canada Airlines—an increase of 32.6% in passengers carried in the first three months; British European Airways—an annual profit of $100,000 per Viscount; Trans-Australia Airlines—an increase in load factor with a consistently high utilization which has been as great as 13½ hours per Viscount per day.

Such brilliant records speak for themselves. And they speak well for Capital's astuteness and enterprise in introducing the world's first turbo-prop service between cities in the United States.

Behind the Viscount stands the great name and service organization of the Vickers Group—internationally famous as makers of aircraft, ships, industrial machinery and precision equipment.

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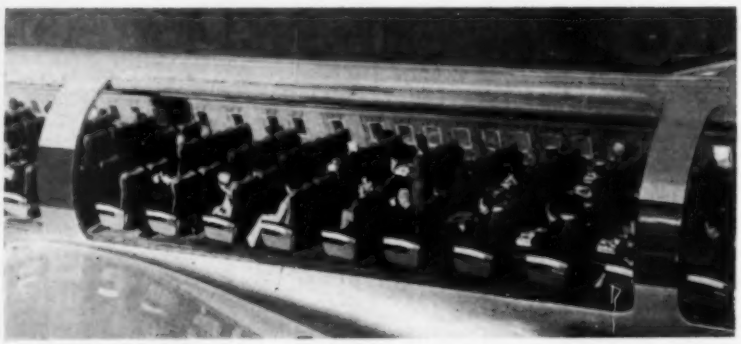
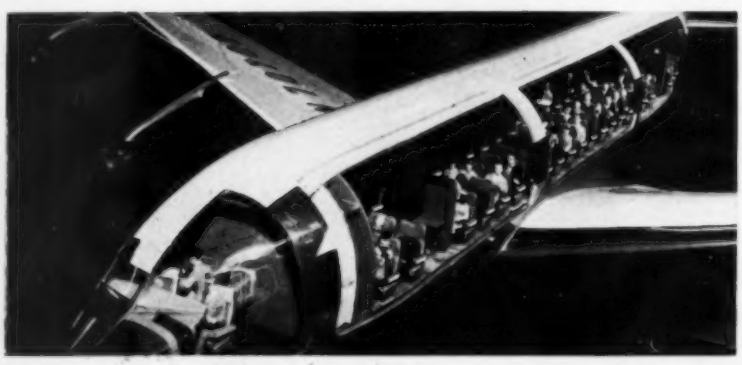
Industry News Digest





CUTAWAY SCALE MODEL of the standard commercial version of the Boeing 707 four-jet transport was displayed last week at the Second National Turbine-Powered Air Transportation meeting sponsored by Institute of the Aeronautical Sciences at Seattle. Five-abreast seating provides room for 108 passengers. The 707 is powered by four Pratt & Whitney Aircraft JT-3 turbojets (commercial version of J57).

NAL Offers to Buy NEA Stock Control

National Airlines last week offered to buy the Atlas Corporation's controlling stock interest in Northeast Airlines. Offer was made from the witness stand at CAB hearings in the New York-Florida Case by NAL president G. T. Baker, who said his company would offer debentures for Atlas stock.

Atlas holdings in NEA amount to 98.11% of the New England line's preferred stock and 54.53% of common.

Baker did not specify a price, explaining " . . . we know an agreement on the price of an airline cannot be reached on the witness stand." However, he added, "National is completely sincere in its offer to acquire and operate Northeast Airlines."

NEA is one of various applicants to compete with National and Eastern Air Lines for New York-Miami traffic.

Baker said National is "dead serious" in its belief that certification of a third carrier will ruin National and this route. He predicted NEA would become more heavily subsidized if granted the route.

Baker previously had offered to buy the Atlas holdings for an amount, according to Atlas president Floyd B. Odlum, of $5.5 million in debentures. Baker said that offer apparently was not accepted because of "Northeast's alleged fear National would not operate the unprofitable points on NEA's system." "National," he added "is willing to take over all of Northeast's operations."

Bell Developing Two New Prototypes

The possibility that Bell Aircraft Corp. might again become a major plane producer was seen this month in the disclosure that the company's Buffalo plant, which has not mass-produced any aircraft since the end of World War II, will be flying two new prototypes late next year.

AMERICAN AVIATION has learned that Bell now holds orders to build a prototype of an advanced vertical take-off fighter well beyond the capabilities of the Bell-financed VTOL and a prototype of an advanced tactical plane, probably a bomber.

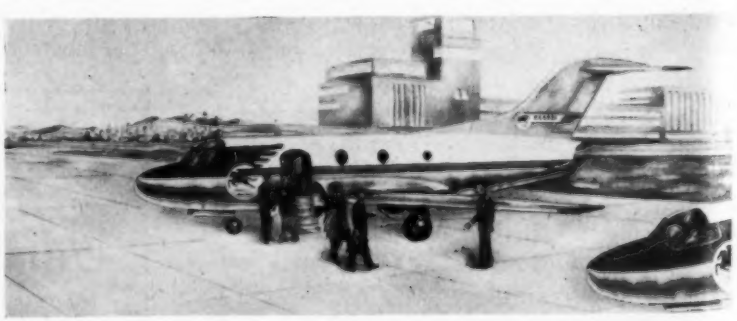
Like the VTOL, the new VTO fighter prototype would be more like a conventional plane than other VTO aircraft, including the Ryan Model 69, the Lockheed XFV-1 and the Convair XFY-1. It will use more powerful turbojets than the two Fairchild J44s fitted on the VTOL.

The tactical bomber, presumably supersonic, would compete for Air Force orders with two other prototypes. Douglas Aircraft and Glenn L. Martin Co. have received AF development contracts for similar bombers.

Bell X-1A Explodes

The Bell Aircraft X-1A research plane, exploded last week a few seconds before it was to be released from the mother ship 30,000 feet above Edwards AFB, Calif.

The pilot, Joseph A. Walker, 34, managed to get out of the cockpit of



FAIRCHILD AIRCRAFT'S BID for the business flying aircraft market is a light four-jet transport capable of 560 mph speeds. Company designation is M-225. This is one of several new projects in advanced planning stage at Fairchild's Hagerstown, Md., plant. M-225, shown in artist's version, would carry seven passengers, crew of two.

the X-1A and back into the mother plane, a B-29, in time to escape injury. The B-29 pilot dropped the X-1A onto a bombing range near the air base.

The X-1A holds the world speed record of 1,650 mph and the world altitude record of more than 90,000 feet.

GE Develops Sight For Supersonic Jets

General Electric has developed a new lightweight computing gunsight for supersonic jet fighters that can be used with all weapons normally carried by such aircraft for air-to-air and air-to-ground firing.

New K-19 sight reportedly maintains a high degree of reliability and accuracy although considerably lighter than previous models.

Powers Resigns at C-W

Edward M. Powers, retired USAF major general, has resigned as vice president-engineering and a director of Curtiss-Wright Corp. He said he would remain with the company in a consulting capacity until January.

Royal Gull Amphibian Production Begins

Production and marketing of the Royal Gull five-place amphibian began this month at Milwaukee, according to announcement of Royal Aircraft Corp., a subsidiary of Kearney & Trecker Corp.

Royal Gull is being produced under arrangement with Piaggio & Co. of Italy, which ships airframe and wings to the U.S. American-made parts and accessories are added when plane is assembled at Milwaukee. Powerplants are two 270 hp Lycomings turning three-blade full-feathering Hartzell pusher props. Cruise speed is 160 mph at 70% power; top speed is 184 mph; range more than six hours; useful load is 1,700 lbs.

CAB Rejects Alaska's Bid for Lower Fare

Civil Aeronautics Board has turned down Alaska Airlines' request for a $15 lower fare for its DC-4 aircraft than for competitive DC-6B tourist flights of Pan American World Airways between Seattle and Fairbanks.

The decision, which drew a dissent from Vice Chairman Joseph P. Adams, came in the States-Alaska Case and was based on conclusions that "the DC-6B is not significantly more expensive to operate than the DC-4," and "a fare differential would lessen the incentive of the carriers to introduce better equipment and thereby discourage the development of a sound air transportation system . . ."

The Board thus set minimum fares for all types of equipment used in tourist services to and from Seattle as follows: Fairbanks, $90; Anchorage, $75; Juneau, $55; and Ketchikan, $43.

Adams disagreed with the ruling which he said "reflects a policy which wrongfully refuses to recognize the need for reduced fares on obsolescent equipment in long-haul competitive markets."

All-Cargo Experiment Failure, AA Contends

American Airlines called the "all-cargo" experiment a failure and Slick Airways said that freight development needs the stimulus of specialized carriers as briefs were exchanged recently in CAB's All-Freight Renewal Case (east-west phase).

Filed in the face of a CAB Bureau Counsel brief which recommended new seven-year certificates for Slick and The Flying Tiger Line, the AA brief charged that every single expectation which led CAB in 1949 to launch the all-cargo experiment has proved false.

CAB attorney Seymour Wenner claimed that a further test period is necessary but that the cargo lines, though given the added authority for carriage of express and experimental 3¢ mail, should not be given full rights to carry airmail.

Slick, claiming it has fully recovered from last year's merger episode in which it was involved with Flying Tiger, reasserted that its mail request does not contemplte the right to subsidy. The carrier charged that American, United and TWA "simply do not furnish each other" the kind of competition in the cargo field that creates development, progress and growth.

AIR FORCE F-101A supersonic, long-range fighter being developed and produced by McDonnell Aircraft Corp., is shown in top photo with its XF-88 prototype (left) in final assembly area. New Voodoo, which retains aerodynamic parameters of earlier model, is 12 ft. 3 in. longer and three feet higher, but its stubby wings are actually shorter than those of XF-88. It is powered by two Pratt & Whitney J57s. Photo of F-101A below was taken recently at Edwards AFB, Calif.

Letters

Liked AZ-8 Article

To the Editor:

I am very pleased with your article describing our new AZ-8 aircraft (AMERICAN AVIATION July 18) and am looking forward to showing you the realization of our design in due time.

FILIPPO ZAPPATA
Technical Director
Costruzioni Aeronautiche
Cascina Costa, Italy

About Comfort

To the Editor:

"The Disgrace of Airliner Washrooms" (AMERICAN AVIATION—June 20) accurately reflects a condition that has existed in air transports ever since man took to flying. From before the Curtiss Condor days through the DC-3 and up to the present Super-G and DC-7 the lavatory facilities have been apparent stepchildren to air-conditioning, OMNI and orchids for the passengers.

I believe it is the lack of basic comfort within the "essential" compartment that is the psychological factor in the over-all uncleanliness of the washroom facilities. After uncomfortable minutes aboard the primitive commode that serves even first-class passengers, it is no wonder that they feel they have returned to pioneer days!

What is being done to alleviate these deplorable conditions?

You will not find the answer in even the most recent airliner produced. It can be found only in the modern business transport planes which have been designed for business men who demand air travel IN COMFORT.

Your program for cleanliness and decorum in airline washrooms is one that deserves the highest commendation and whole-hearted support of all who are associated with flying.

WILLIAM K. LAWTON
Advertising Manager
L. B. Smith Aircraft Corp.
Miami, Florida

Air Force to Rescue

To the Editor:

I read with interest your comments on washrooms and in all respects they duplicate mine.

As a point of interest you may like to know that there is now fully designed and tested by U. S. A. F. an incinerating toilet (which can also be arranged to dispose of wash water) that we would like to apply to civilian airline use. Application of this unit to civilian airline use should certainly appeal to both passengers and operating personnel.

The program is now bogged down due to lack of funds to complete a redesign to meet aircraft weight and safety requirements. We hope to get it started again soon, although I must admit the airframe builders do not seem particularly interested in this phase of passenger comfort. The operating airlines, I am afraid, are going to have to force the issue with them. We hope we can accomplish this also.

JOHN C. FLEMING
Fleming Engineering Service Co.
Fort Worth, Texas

THE SLEEK NEW USAF MARTIN B-57 TACTICAL BOMBER IS EQUIPPED WITH THE ARO 5 LITER LIQUID OXYGEN CONVERTER

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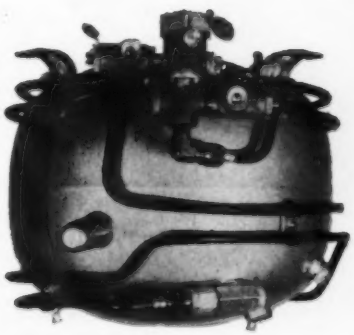
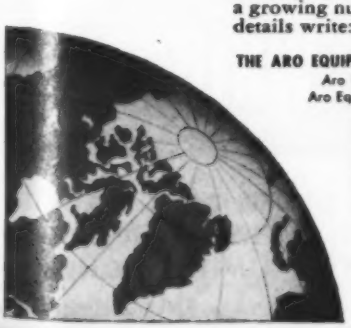
This is typical of many ARO contributions to aviation progress . . . with world leadership in the design, development and manufacture of oxygen equipment. Leading aircraft builders today depend on Aro for a growing number of precision products. For further details write:





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Personal View

By WAYNE W. PARRISH

Victory For Airport Aid

AT LAST!

At last a really impressive federal airport aid program is an actuality. At last the cities which have long since passed bond issues, or otherwise raised funds waiting for matched federal funds to be available, can look forward to completing some urgently-needed projects.

After a week's interlude from the time Congress sent the bill to the White House, President Eisenhower signed into law an authorization for $231,500,000 for use in matching funds.

This means that the CAA can enter into grant agreements immediately for sums up to $42,500,000 for the current fiscal year ending next July 30, and at the rate of $63,000,000 per year for the next three fiscal years.

Since the CAA already has on hand $20,000,000 for the current fiscal year through its regular appropriations, the over-all total federal airport aid program now in hand for four years is $251,500,000.

It should be duly noted that it was Congress, not the Administration, which forced the issue. Up to the very end the Bureau of the Budget was anything but enthusiastic and earlier the Commerce Department took a dim view of the program. There had been reports that the President might veto the bill because of Budget Bureau objections.

No small credit goes to the American Municipal Association, the Conference of Mayors and similar groups which fought hard and effectively for federal aid. In the House, Representative Oren Harris, the Arkansas Democrat, can take a deep bow. In the Senate it was Mike Monroney, the Oklahoma Democrat, who carried the ball.

Now after a considerable time lag during which airport aid funds were either zero or piddling, the CAA should lose no time in entering into grant agreements. (CAA must request the actual money from Congress each year but the obligation is already assumed). Fortunately, we think, the program is under the direction of Herbert H. Howell, director of airports, who is thoroughly experienced and highly respected. Fortunate, also, is the fact that Howell anticipated the bill's enactment by completing in advance a considerable amount of programming. The take-off should be smooth.

Marcellus Scores

BY ANY AND all standards Marcellus Murdock is a great and good friend of aviation. As publisher of *The Wichita Eagle*, out in Kansas, he has been a staunch backer of all worthy aviation enterprises and programs. But the colorful 72-year-old publisher has just performed an extraordinary feat to add to his record. He started flying when he was 46, back in 1928, and has continued to fly, but late last month he passed with flying colors his instrument rating flight test. His friends hope he won't wait until he's 90 to fly through the sonic barrier; they think he ought to do that before he's 80. He ought to save something like a nuclear-powered flight around the world for his later years.

Industry Help Needed

One of these years a National Aircraft Museum will be a reality in Washington but the long-range program has moved very slowly. Meantime the pioneers in aviation who haven't been recently to the old inadequate Smithsonian building (erected in World War I to conduct tests on the Liberty engine) would get a shock if they could see the deterioration of some of the highly prized historical displays.

This is not the fault of Paul Garber, head curator of the aviation collection, who appreciates as much as anyone the necessity of preserving historical airplanes and engines. But Garber has only two men available for maintenance. The exhibits are crowded to the point at which protection from the public is impossible. (A Fokker D-7 fighter has twenty finger holes in the fabric). One of the most pressing problems is preserving some famous old engines, some of which are deteriorating sadly. But preservation requires pressure steam baths and other treatments and there are no funds available.

Perhaps this is a worthy project for the aircraft industry which could undertake proper preservation until such time as Congress authorizes the funds for an impressive and adequate museum.

A Good Record

Public servants who get off the beam usually steal the limelight while those who work quietly and efficiently in government service get orchids all too infrequently. In an effort to try to remedy the latter situation, we hand a basket of orchids to Al Koch, who retires Sept. 30 after 25 years with the CAA. From an aeronautical inspector at the start, Koch progressed to many posts, his current being director of aviation safety. He's been 38 years in aviation altogether and will do consulting work when he leaves the government. A quiet, unassuming, but sensible and efficient administrator, Koch typifies, in our opinion, the finest of public servants.

No Comment

To our desk the other day came a colorful eight-page pamphlet promoting the new railroad travel credit plan stressing advantages over the airline and other credit plans. On one page was a list of some of the 150,000 new rail card holders. Number two on the list, so prominent it can't be easily overlooked, is the Air Transport Association. We extend our best wishes to ATA for complete enjoyment of all rail trips by its personnel.

Production Spotlight

• General Electric is prepared to build the Napier Eland turboprop engine under license if Lockheed accepts the British design as an alternate powerplant for the Electra. A GE team recently visited England to discuss production methods with Napier, then went to the west coast for talks with Lockheed.

• New 15-foot diameter Aeroproducts Model 196A propeller undergoing performance tests at Wright Field propeller laboratory is proposed as an alternative installation on the Lockheed C-130A Hercules. Propeller now used on the C-130 is a Curtiss-Wright three-bladed Turboelectric design.

• Beech Aircraft sold 277 Bonanzas, 81 Twin-Bonanzas and 63 Super 18s the first nine months of its fiscal year (up to June 30). This compares to sales for the same period a year ago of 229, 44 and 25 respectively. Present production rate: Bonanzas, 1½ a day; Twin-Bonanzas, ½ a day; Super 18s, four a month.

• Blackburn and General Aircraft will show three new Turbomeca-license engines at the Farnborough show: the Artouste Bn A1, rated at 475 shp; the Palouste Bn Pe 2, rated at 258 gas hp (ghp), for use in the Fairey light army helicopters, and the Coupled-Turmo Bn TC1, 908 shp, for the Westland-Sikorsky S-55.

• Rolls-Royce has designed five versions of the Conway bypass turbojet, but no illustrations, details or power ratings have been revealed by security.

• Armstrong Siddeley Motors existence of the Sapphire ASSa 5 and ASSa 9 (no details revealed) and the ASSa 4 of 9,700 lbs. thrust.

• Air Force is considering a version of the Convair T-29 trainer fitted with wingtip mounted Fairchild J44 jets for thrust augmentation. Design is intended to fit a future Air Academy need for high gross, high altitude takeoffs at Colorado Springs where field elevation ranges higher than 6,000 ft. above sea level.

• Cessna Aircraft's fall production rate, with changeover to 1956 models, will include four 170s daily, three 180s daily and one 310 twin per working day. Company's July production of 180s was five a day. Cessna delivered 932 aircraft valued at more than $15.3 million the first six months of 1955.

•De Havilland has made five variants of the Spectre hydrogen peroxide fighter rocket motor: D Spe 1, 2, 3, 4 and 5.

• D. Napier & Son, Ltd. has announced four new turbines: the Oryx NOr 2 of 700 ghp, NOr 4 of 925 ghp, NOr 10 of 1,250 ghp and the Gazelle of 1,260 shp.

• Rolls-Royce rates the Soar RSr 1 at 1,760 lb. static thrust and the Soar RSr 2 at 1,860.

• Navy is reported considering shelving the Lockheed XFV-1 VTO. Company has discontinued flight testing the aircraft.

• Allison's Model 501-D10 commercial version of the T56 turboprop probably will be price-tagged at around $90,000.

TURBOPROP XF-84H experimental fighter made its first flight July 21 at Edwards AFB, Calif. The new Republic Aviation aircraft is powered by an Allison XT40-A-1 turbine engine and is being used as a testbed for supersonic propellers built by Aeroproducts, Curtiss-Wright and Hamilton Standard. Triangular fin just behind cockpit is a vortex gate to neutralize partially the tremendous torque set up by the prop.

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Aircraft Controls

. . . new, improved butterfly air valves for higher pressure, higher temperature applications

Keeping pace with the aircraft industry's ever-increasing temperature and pressure requirements, Barber-Colman Company maintains a constant program of air valve improvements. The advanced type motor-actuated butterfly valve shown here is an example of the new developments that continuously result. Featuring extremely low leakage, this new Barber-Colman air valve is designed especially for today's high temperatures and pressures . . . up to 900° F., 250 lbs. per square inch. Proof pressure at 900° F. is 460 psig. This valve is particularly suited to control of air in pressurization, refrigeration, and heating systems . . . anti-icing systems, purge gas systems, exhaust bleed systems . . . and many other applications. Barber-Colman butterfly valves, as well as sliding gate and iris types, are available in a wide range of sizes to meet most requirements. Special designs can also be developed where needed. Thus, when designing any system in which air is handled, consult Barber-Colman engineers for the valve best suited to your application.

- ✓ **DUAL RINGS** for longer sealing surfaces, low leakage. Rings and butterfly lubricant baked on at 1200° F. for minimum breakaway torque. Bi-directional air flow.
- ✓ **LOW LEAKAGE** Typical values: 1½" valve—0.25 lb per minute at 230 psig, 850° F. 2" valve—0.12 lb per minute at 170 psig, 75° F.
- ✓ **PRECISION CAST** stainless steel body and butterfly. Castings X-ray inspected. Body reinforced in sealing region, chrome plated for smooth, hard inner surface. 1½" to 4" diameter bores. Aluminum bodies also available for temperatures below 400° F., pressures below 100 psig.
- ✓ **LOAD LIMIT** mechanism automatically de-energizes actuator when predetermined torque is reached. Positive stops assure precision closing.
- ✓ **MOUNTING BOSSES** integral with body. Fittings are bolted flange, V-band flange, AN flanges or special to your specifications.

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When & Where

Aug. 15-20—National Flying Farmers' Assn. convention, East Lansing, Mich.
Aug. 22-23—Symposium on Electronics & Automatic Production. Stanford Research Inst., San Francisco.
Aug. 22-24—American Rocket Society gas dynamics symposium, with Northwestern University co-sponsor, Evanston, Ill.
Aug. 24-26—1955 Ignition Conference sponsored by Bendix Aviation Corp., Sidney, N. Y.
Aug. 24-26—1955 Ignition Conference sponsored by Scintilla Div., Bendix Aviation Corp., Sidney, N. Y.
Aug. 24-26—Western Electronic Show and Convention, Civic Auditorium and Fairmont Hotel, San Francisco, Calif.
Aug. 25—Annual corporate mtg., West Coast Electronic Manufacturers Assn. (San Francisco and Los Angeles councils), San Francisco.
Sept. 3-5—National Aircraft Show, sponsored by Air Foundation, Philadelphia International Airport.
Sept. 8—Airwork engine forum, sponsored by Pratt & Whitney and Bendix, Millville, N. J.
Sept. 16—Airwork engine forum, sponsored by Pratt & Whitney and Bendix. Miami, Fla.
Sept. 19-21—American Rocket Society fall meeting, Los Angeles.
Sept. 21—Southwest Airmotive engine forum, sponsored by Pratt & Whitney and Bendix, Dallas, Tex.
Sept. 21-22—American Helicopter Society second annual western forum, Los Angeles.
Sept. 25-27—International Northwest Aviation Council's 19th annual conference, Yakima, Wash.
Sept. 26-27—Automation Symposium, sponsored by R.E.T.M.A., Univ. of Pennsylvania, Philadelphia.
Sept. 26-Oct. 8—USAF second annual all-jet Fighter Weapons & Gunnery Meet, Yuma AFB, Ariz. and Nellis AFB, Nev.
Sept. 27—Airport development & operations conference, Syracuse, N. Y.
Sept. 28-29—Industrial electronic conference, sponsored by AIEE and IRE, Detroit.
Sept. 28-29—Industrial Electronics Conference, sponsored by A.I.E.E. and I.R.E., Park Sheraton Hotel, Detroit, Mich.
Sept. 29-30—Radio Technical Commission for Aeronautics, Fall Assembly, Hotel Statler, Washington, D. C.
Oct. 1—Symposium on small gas turbines, sponsored by American Society of Mechanical Engineers and Brooklyn Polytechnic Institute, New York City.
Oct. 3-5—Eleventh annual National Electronics Conference, Hotel Sherman, Chicago, Ill.
Oct. 4-6—11th Annual Spark Plug & Ignition Conference, sponsored by Champion Spark Plug Co., Toledo.
Oct. 5-7—National Airports Conference (sponsored by American Association of Airport Executives and the University of Oklahoma, Norman, Okla.
Oct. 31-Nov. 1—East Coast Conference on Aeronautical and Navigational Electronics, sponsored by I.R.E., Baltimore, Md.
Nov. 7-9—Eastern Joint Computer Conference (IRE-AIEE-ACM), Hotel Statler, Boston.
Nov. 28-30—Instrumentation Conference and Exhibit, sponsored by I.R.E., Atlanta Biltmore Hotel, Atlanta, Georgia.

INTERNATIONAL

Aug. 30—International Civil Aviation Organization air navigation conference, Montreal.
Sept. 6—International Civil Aviation Organization conference on draft protocol to amend Warsaw convention, The Hague.
Sept. 6-11—Society of British Aircraft Constructors Aircraft Show & Flying Display, Farnborough, England.
Sept. 7—International Federation of Independent Air Transport management committee meeting, London.
Sept. 19—IATA traffic advisory committee meeting, Miami, Fla.
Sept. 20—IATA annual traffic conference, Miami, Fla.
Oct. 10—IATA legal committee meeting, Nassau.
Oct. 11-12—Franco-Italian aeronautical meeting, Paris.
Oct. 13—IATA executive committee meeting, New York City.

new team impetus for supersonic propulsion

Added impetus is being given to rocket and ramjet developments by a unique new industrial team. For the first time, mechanical experience in supersonic engine development is linked with chemical experience in the manufacture of special fuels in an integrated research and development program. This has been accomplished by the affiliation of Olin Mathieson Chemical Corporation with Reaction Motors, Inc. and Marquardt Aircraft Company.

A major producer of chemicals and manufactured products, Olin Mathieson makes special fuels at five plant locations. Reaction Motors, Denville, New Jersey, is one of the country's leading developers and manufacturers of rocket engines. Marquardt Aircraft, Van Nuys, California, pioneered the ramjet engine and is the outstanding manufacturer of such power plants for military aircraft use.

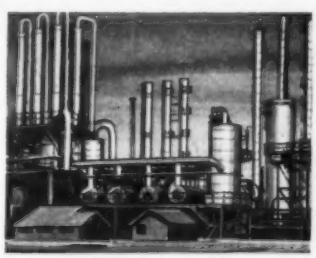
Aimed especially at the advancement of high-speed and high-altitude aircraft and missile power plants, these three affiliated companies provide a combination of skills, experience and facilities which is available nowhere else as an integrated unit.

ROCKETS

Reaction Motors rocket engines powered the Air Force's X-1A to piloted-aircraft speed record of 1600 mph-plus, and Navy's Viking to new altitude and speed records for single-stage rockets of 158 miles and 4300 mph.

RAMJETS

Marquardt Aircraft was responsible in 1947 for man's first flight in a ramjet-powered airplane. The supersonic ramjet has since established records in speed, altitude, distance and endurance for air-breathing engines.

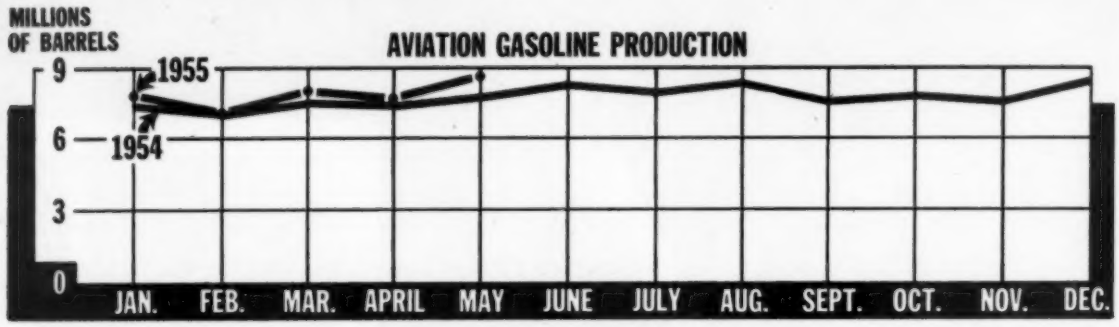


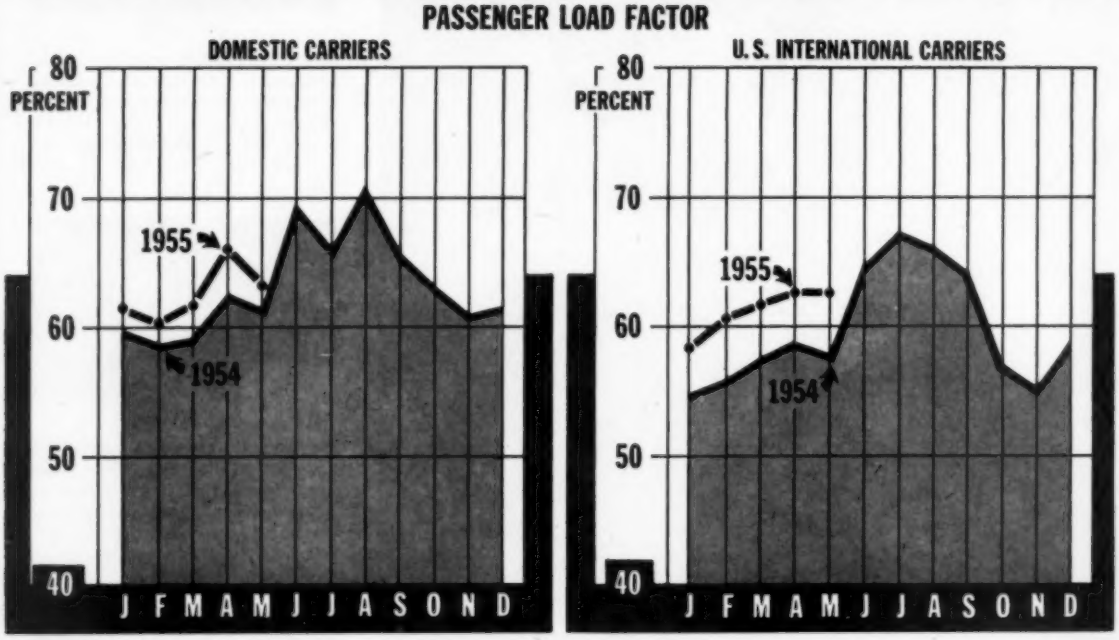
PROPELLANTS

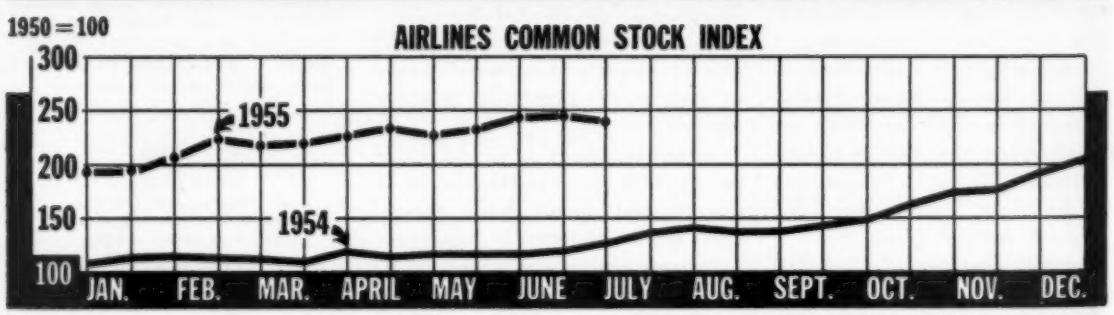
Olin Mathieson produces modern chemicals for supersonic power—ammonia, ethylene oxide, nitric acid, hydrazine, dimethyl hydrazine, and solid propellants. Other chemical fuels and propellants are under development.

MARQUARDT AIRCRAFT
OLIN MATHIESON CHEMICAL
REACTION MOTORS

Pulse of the Industry







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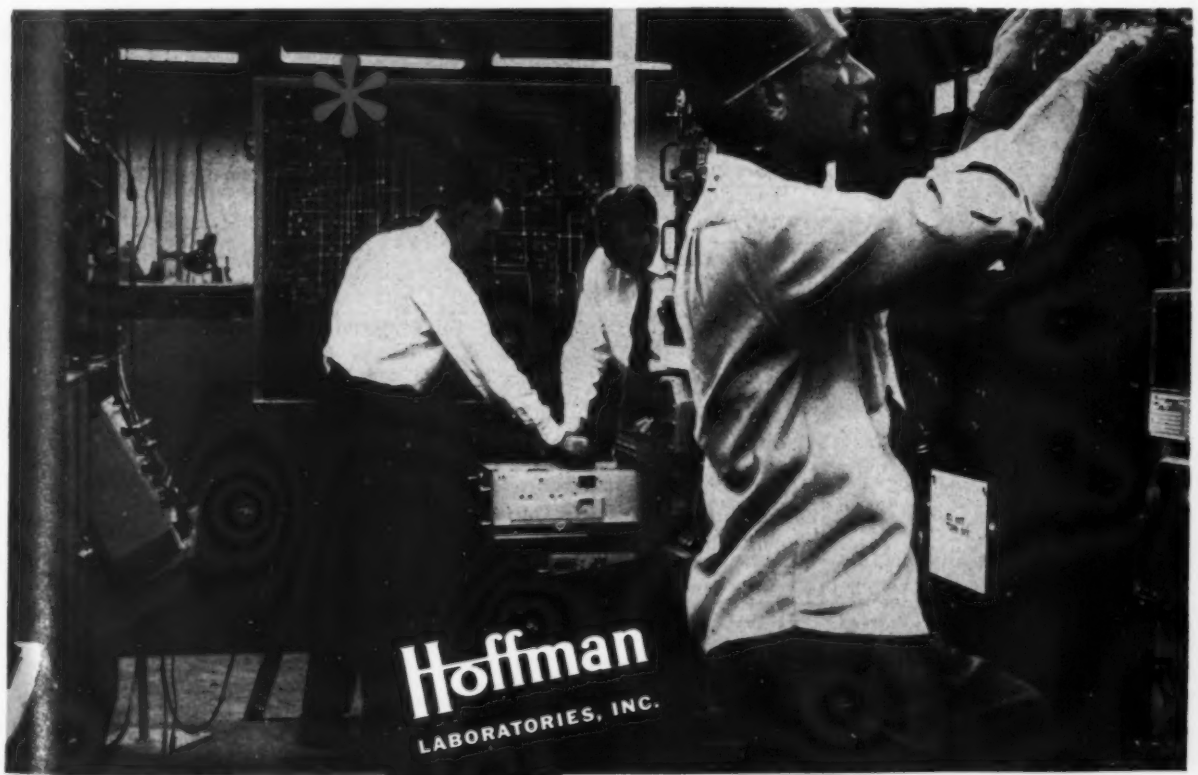

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AIRTRENDS Washington, D. C., August 15, 1955

AIR FORCE APPARENTLY HAS DECIDED to abandon design competitions for new aircraft in favor of awarding Phase I (development) contracts to companies that have experience in building specific plane types. (See page 23.)

Move is designed to cut a year or two off the time required to get a new type from the drawing boards into squadron service. It presently takes about eight years or more to get a new fighter or bomber into operational use.

Aircraft company or companies with the most promising designs would get Phase II contracts to build prototypes and these in turn would lead to production orders.

Despite this move, however, the slow introduction of new models ordered into production to get the bugs out (evidenced in USAF's Cook-Craigie plan and the Navy's FIRM—Fleet Introduction of Replacement Models—program) will continue.

THE ATOMIC-POWERED AIRCRAFT is getting closer. Pentagon officials no longer discuss the plane as being a decade away. Atomic Energy Commission simultaneously describes "significant breakthroughs" in the nuclear plane field during the past year.

Test work on the aircraft reactor at Arco, Idaho, moves ahead.

Best current guess on the nuclear bomber: By 1960.

RE-REVIEW OF THE PLANE PRODUCTION PROGRAM is inevitable, but few changes are expected.

With Harold E. Talbott and Roger Lewis leaving their USAF posts as Secretary and Assistant Secretary for Materiel, respectively, in the next few weeks, their replacements must decide whether stepped up production scheduled for the Boeing B-52, McDonnell F-101 and Lockheed F-104 will adequately meet the threat posed by new Russian aircraft, or whether other types also should be accelerated.

But Gen. Nathan F. Twining, USAF Chief of Staff, already has indicated that it would not be desirable or feasible to speed up delivery schedules of such other fighters as the North American F-100 and Convair F-102.

Top new civilians therefore probably will go along with the Talbott-Lewis planning in a general way, but may make some modifications.

CONGRESSIONAL INVESTIGATIONS of the aircraft industry will carry over into the second session amid Democratic hopes that they will prove fruitful in an election year.

Coming up at the session starting next January are investigations by Rep. George Mahon's Investigations Subcommittee of the House Armed Services Committee. Both groups will consider allegedly high profits made by the aircraft industry.

On the Senate side, one of the committees almost certainly will call back outgoing Air Secretary Harold Talbott for further questioning about his business activities while in office.

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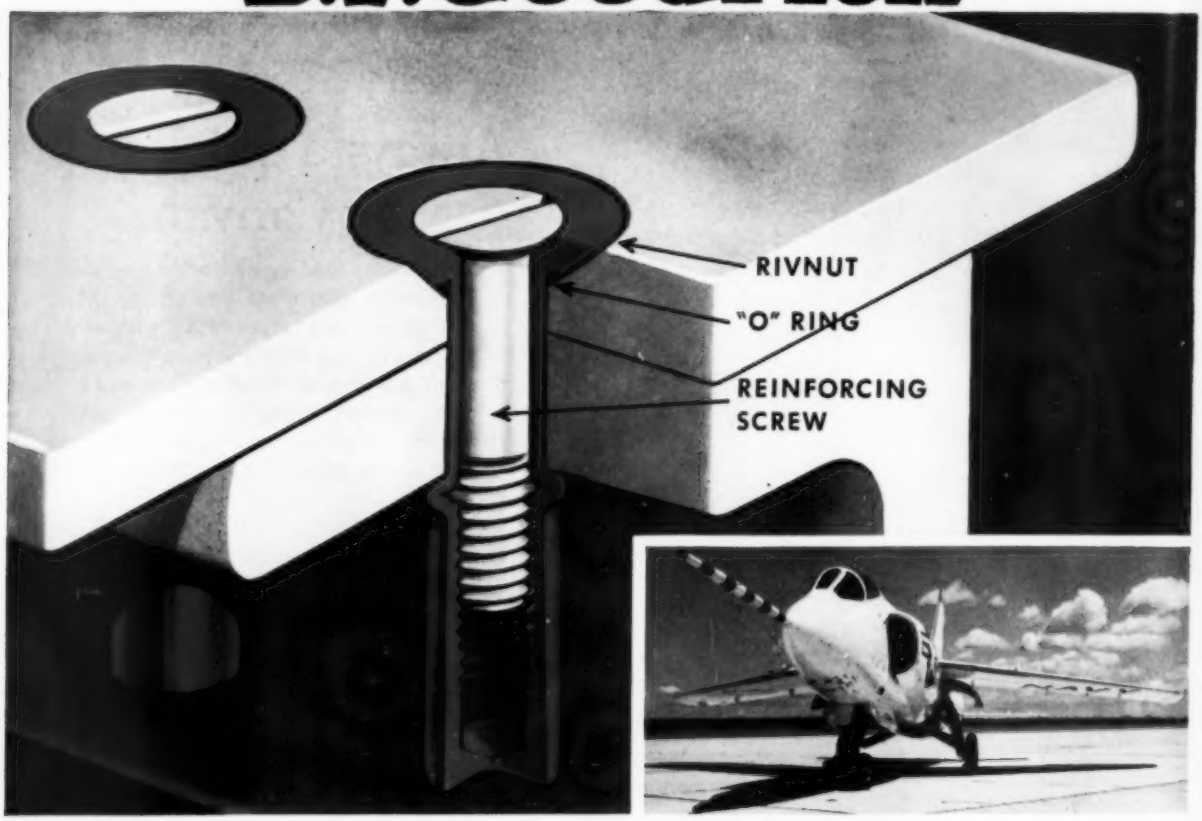
RESEARCH KEEPS **B.F.Goodrich** FIRST IN RUBBER



Special new aviation Rivnut gives Tiger a longer leap

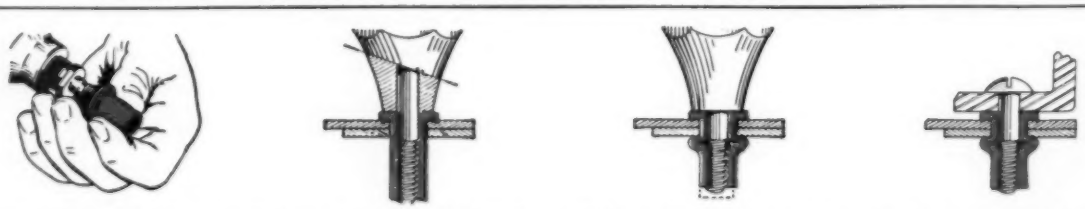
GRUMMAN engineers decided to use integral wing tanks to stretch the range of their F11F-1 Tiger. They would let the single top and bottom aluminum skin panels that form each wing also serve as fuel tank walls. The problem was to find a blind fastener that could join the wing sections tightly enough to stand the strains of supersonic flight and still prevent loss of fuel.

Working with Grumman, B. F. Goodrich engineers solved the problem by developing a new Seal-Head Rivnut with rubber "O" ring. The cross-section above shows how it works.

The B. F. Goodrich Seal-Head Rivnut is installed in a hole that's been drilled and countersunk in the wing skin panel. The Rivnut holds the sections together. The "O" ring makes a fuel-tight seal and withstands temperatures from –65°F. to 225°F. Then a special 150,000 p.s.i. tensile strength screw is screwed into the Rivnut to reinforce it. This fastener has been approved for primary aircraft structure.

Whatever your fastening problem, there's probably a B. F. Goodrich Rivnut that can solve it. For more information, write: *The B.F.Goodrich Company, Aeronautical Sales, Akron, Ohio.*

HOW STANDARD B. F. GOODRICH RIVNUT WORKS:



1. Standard Rivnut is threaded onto pull-up stud of a manual or pneumatic heading tool.

2. Rivnut is inserted, head firmly against work, tool at right angle to work.

3. Tool lever operates pull-up stud, forming a bulge in the Rivnut shank.

4. After upset, at least six Rivnut threads are clean, intact, ready for screw attachment.

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ESTABLISHED JUNE 1, 1937

World's Largest Aviation Publishers
American Aviation

VOL. 19, NO. 6

Army Takes Another Look at Its Air Arm

- **Indications are that Gen. Taylor will recommend aviation activities be expanded.**
- **Army commanders have own ideas on air support not always in keeping with those of Air Force.**

By Robert M. Loebelson

THE role of Army aviation last week was undergoing one of its periodic re-evaluations and indications were that within the next 60 to 90 days the Joint Chiefs of Staff would be presented with a recommendation by the new Army Chief, Gen. Maxwell D. Taylor, that its aviation activities be expanded.

The review was made mandatory by the numerous changes that have taken place in the Army within the past six months. Among them are:

• **Appointment** of Wilber M. Bruckner to replace Robert T. Stevens as Secretary of the Army.

• **Designation** of Gen. Taylor, who commanded the 101st Airborne Division in World War II, as Army Chief of Staff in place of Gen. Matthew B. Ridgway.

• **Selection** of Maj. Gen. James M. Gavin, World War II commander of the 82nd Airborne Division, as Deputy Chief of Staff for Plans and Research.

• **Decision** to make a general officer chief of the Army Aviation Division for the first time. Named to this post last February 28 was Brig. Gen. Hamilton H. Howze, 46, whose previous assignments were as assistant commander of the Second Armored Division in Germany and as Deputy Chief of Staff for Plans of the Seventh Army in Europe.

In an interview with AMERICAN AVIATION, Gen. Howze indicated his newness on the job prohibited him from making too many comments about the future of Army Aviation. He also indicated, however, that the current re-evaluation, which he is monitoring, might well result in numerous changes. In answering specific questions, Howze said these proposed changes, which will have to be approved by the JCS, would probably result in:

• **No direct procurement** of aircraft and helicopters by the Army. Air Force and Navy, Howze said, will continue to handle the development and purchase of Army aviation requirements because of their greater experience.

Gen. Howze

• **No increase** in the weight limitation on planes which the Army may operate. Under a November 1952 "memorandum of understanding" between the Army and Air Force, the Army may not buy fixed-wing aircraft grossing more than 5,000 pounds but there is no weight limit on helicopters.

The head of the Army Aviation Division also said it is highly unlikely that the Army will seek to expand its use of fixed-wing aircraft (now used primarily for observation and reconnaissance) to include the support of ground troops.

However, it is hardly a secret that the Army has never been completely happy with the way the Air Force has provided tactical support. During the Korean War, Army commanders publicly praised the efforts of USAF F-84 and F-86 fighter-bombers but privately intimated that there were plenty of occasions when fighter-bomber support could have been used by the ground forces but proved unavailable. So other Army officials, without the rank of Gen. Howze, feel the Army might be remiss in not trying to get some fighter-bombers of its own.

Another area where the Army tends to be at odds with the Air Force is the matter of airlift. During hearings before the Senate Armed Services Committee earlier this year former Secretary Stevens declared himself "not satisfied" with present airlift capabilities being provided by the Air Force. AF officials counter, however, by pointing to the hundreds of airlift-type aircraft already in existence and more transport types coming.

The typical Army commander's philosophy about the use of aircraft boils down to something like this:

"I know what kind of observation, reconnaissance, and tactical support my troops need far better than any Air Force general ever could. Therefore, the more planes I can control directly (without having to request them from the Air Force), the better off the Army will be.

"After all, aviation is just a fourth member of the Army's combat team. It's just as much a part of our operations as our artillery, infantry, and armored divisions. Aircraft and helicopters are simply another form of enveloping the enemy, only this way it's vertical envelopment."

Maj. Gen. Paul D. Adams, Deputy Assistant Chief of Staff, G-3, recently summed up the Army's aircraft requirements before the House Military Appropriations Subcommittee. He outlined the different categories of Army aircraft:

• **Organic Army aircraft,** helicopters and fixed wing aircraft—These provide the Army commander with the capabilities of reconnaissance, battlefield surveillance, artillery fire, observation, air movement of small units of combat

troops, rapid means of communication, evacuation of battlefield wounded and resupply of forward battle units.

• **Tactical support transport aircraft**—These provide the essential logistic support from rear supply bases forward to Army supply points and also handle encompassing airborne assaults by paratroopers, in formations as large as an Army Corps. They are also used to move corps and Army reserve divisions for exploitation and pursuit operations.

• **Fighter-bombers**—These are employed for close support of ground forces and to knock out targets selected by the advance Army unit commanders which cannot easily be handled by surface forces.

In his testimony, Gen. Adams made no other mention of fighter-bombers but declared, "Supporting aircraft, whether operating from bases to the rear of the Army zone of battle responsibility, or from advance bases in the corps and division areas, are an integral part of the Army operation. These aircraft must be under control of the Army commander to insure unity of effort."

Gen. Adams also told House members that while there is currently no single Army air command, G-3 is studying the problem to see whether an organization of that type should be evolved. On the other hand, Lt. Gen. Willison B. Palmer, the Army's Vice Chief of Staff, flatly told a Senate group, "We have no Air Army and at present do not propose to have an Air Army."

At present, Army Aviation is an undefined type of organization, with no direct chain of command or table of organization. Each segment of the Army has certain individuals whose responsibilities take in aviation and sundry other activities. Examples:

• **In the office** of the Army Secretary, three individuals are responsible for such major efforts as representation on the Air Coordinating Committee, airspace problems, etc. They are Lt. Cols. L. W. Leeney of Infantry and Raymond R. Evers of Artillery, and Maj. Roy Haney of Artillery.

• **In G-1 (personnel),** the individuals charged with aviation problems include Lt. Cols. J. Elmore Swenson of Artillery and Edward Ramsey of Infantry and Maj. Zane L. Anderson of Armor.

• **In G-2 (intelligence)** Maj. George E. Handley of Artillery is the officer handling aviation matters.

• **Under Gen. Howze** in G-3 (operations) are Cols. Warren R. Williams of Infantry and James F. Wells of Artillery, Lt. Cols. Oscar G. Goodhand (Field Artillery), Edgar C. Wood (Armor), John L. Rowan (Transportation Corps), S. S. Doherty (Signal Corps) and Carl E. Bobo (Artillery) plus Maj. Robert E. Trigg and Capt. George C. Connor, both of Artillery). This is the organization that decides how and where Army planes and helicopters are to be used.

• **In the office** of the Deputy Chief of Staff for Logistics (and handling Army aviation supply activities) are Lt. Cols. Jack J. Marinelli, Robert J. Low, John L. Klingenhagen, John R. Riddle and Majs. Melvin C. Monroe and James E. Ingram. All but Klingenhagen (who is from the Transportation Corps) are Artillery officers.

• **Under Gen. Gavin,** and working on aviation plans and research, are Lt. Col. Joseph E. McDonald and Maj. James A. Shelton, both of Artillery.

• **In the Corps of Engineers,** the individuals handling such aviation activities as airfield and runways are Lt. Col. Robert M. Rawls and Majs. William F. Roos and Robert W. Reisacher.

• **Four Signal Corps** officers, Lt. Col. John L. Wilson and Capts. Donald P. Dickinson, William H. Grady, James H. Gooden and Amos B. Shattuck, take care of electrical equipment tailored for Army aviation needs.

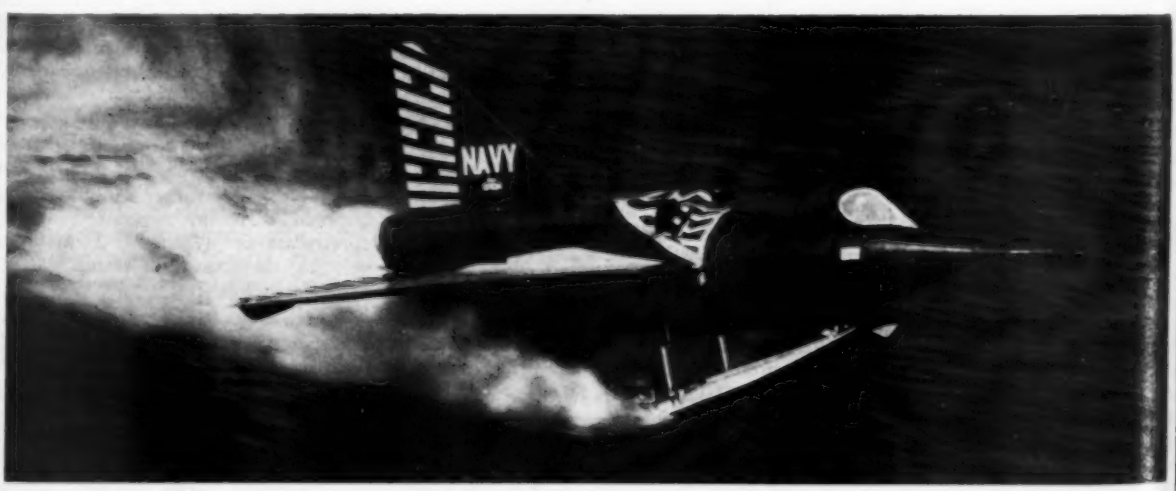
• **Under the Office** of the Chief of Transportation and directly responsible for the actual ordering (through the Navy and USAF) of Army planes and helicopters are Col. Robert Neely, Lt. Cols. Thomas Haynes, George L. Lovett, Michael J. Strok and Karl Zornig, and Capts. James R. Barkley, Joseph M. Bowers, John L. Johns, Billy B. McPhail, Alfred J. Reese, Robert R. Yates, Wallace G. Reed and Ralph L. Sandberg.

• **Army Aviation School,** Camp Rucker, Ala., is commanded by Gen. Carl I. Hutton with Col. Jules E. Gonseth, Jr., as assistant. Here prospective Army pilots get their actual flight training.

• • •

Aero Commanders Delivered

Aero Design & Engineering Company delivered its first USAF "off-the-shelf" order of 15 Aero Commanders earlier this month. The Model 560A (AF designation L-26-BM) has been assigned to the White House for President Eisenhower's use, replacing the older model which had been on lease.



A CONVAIR XF2Y-1 SEA DART has been refitted with a single ski and is undergoing tests with the new configuration. Other Sea Darts use twin hydro-skis. Powerplants are two Westinghouse J46 jets. The YF2Y-1, prototype Sea Dart, was destroyed during a demonstration last November.

Air Force Awards Phase I Contracts For Three New Supersonic Planes

• Lockheed, Northrop and North American to join forces on long-range Mach 2 interceptor; Republic, North American to collaborate on fighter-bomber; Lockheed, Martin to develop tactical bombers.

The aircraft that USAF will be flying in the 1960s have been born with award of Phase I development contracts to six airframe companies for three types. Included are two Mach 2 fighters—along-range interceptor and a fighter-bomber—and a supersonic tactical bomber.

In awarding the contracts, Air Force said it was eliminating several steps formerly customary in hopes of cutting a year or two off the normal development time for new military aircraft. It now takes up to eight years to get a new plane from the drawing board into squadron service.

Contract awards went to:

• **Lockheed Aircraft Corp.,** Northrop Aircraft, Inc. and North American Aviation, which will work on the long-range interceptor.

• **Republic Aviation Corp.** and North American, both of which will evolve a fighter-bomber.

• **Douglas Aircraft Co.** and The Glen L. Martin Co., which will develop supersonic tactical bombers.

All of the aircraft designs will undoubtedly use one or more of the three 15,000-pound thrust turbojet engines currently under development, the Wright J67, Pratt & Whitney J75 and General Electric J79.

The Air Force said the customary competitions were eliminated and that two or more companies were selected for each plane type "on the basis of engineering competence . . . past performance, and availability of engineering effort." Actually the USAF had conducted a competition for the Mach 2 interceptor in which several other firms had submitted designs.

Observers considered it significant that McDonnell Aircraft Corp., whose new F-101B interceptor comes close to USAF requirements, and Convair, which has been proposing its XB-58 supersonic delta bomber as a tactical bomber and as an interceptor, were not included in the Phase I contract awards.

Although the Air Force gave no details about the new aircraft to be developed, it is logical to expect that:

• **Lockheed will come up** with a straight-wing interceptor which will be much heavier but will incorporate many of the features of its F-104 lightweight day superiority fighter.

• **North American's interceptor** will be a refinement of the swept-wing F-1001, which the company has been trying to sell to the USAF as a replacement for the F-86D.

• **Northrop's interceptor** will be a delta containing many characteristics of its present F-89D Scorpion.

• **NAA's fighter-bomber** will probably be a much advanced F-100 type plane with a more powerful engine.

• **Republic's fighter-bomber** will be based on either the jet-plus-ramjet with powered XF-103 or its upcoming J75-powered F-105.

• **Douglas' tactical bomber** will be a refinement of its present B-66.

• **Martin's light bomber** will include many B-57 features but will actually be almost a brand-new design.

The three varieties of wings (straight and thin, swept, and delta) to be used on the three interceptor designs indicates that there is as yet no final decision within the Air Force as to what kind of wing would do the best job on an interception mission.

The Mach 2 interceptor obviously will have to carry a tremendous load of fuel if it is to meet the enemy bombers 800 or more miles from its home base, have enough fuel to engage in combat, and return to its home base. The aerodynamic wing shape will be an important factor but apparently there is no firm finding as to which would be superior in such a role.

(So far as is known, Russia has no supersonic all-weather interceptors flying. At recent air shows, the Soviets displayed about 30 straight-wing transonic interceptors capable of operating in any weather.)

Thus, the USAF has entered its next phase. With supersonic fighters already operating, the fighter of the 1960s will have to fly at Mach 2. With transonic light bombers in service, the supersonic tactical bomber became inevitable. One design of each of the three types will be selected for mass production after a thorough evaluation of the designs is made by the Air Research and Development Command.

• • •

NEWEST PHOTO of Convair's XFY-1 VTO fighter shows the Pogo approaching Lindbergh Field, San Diego, for vertical letdown. Cross mark under prop shows spot where plane will land. XFY-1 is powered by an Allison T40 turning contra-rotating Curtiss Turbolectric props.

Aviation and Electronics Industries Combine Skills to Launch Satellites

Where does the aviation industry fit into the earth satellite picture? What will aircraft firms get out of the program to put a basketball-sized artificial moon 200 miles up?

The answers are still unclear, except that the aviation and electronics industries initially will combine their talents to get the earth satellite up to its extraterrestrial orbit. Eventually, future space vehicles will probably emanate from the plants of airplane producers.

Certain firms seem to be naturals for the earth satellite. North American Aviation's rocket engines will almost certainly propel the "moon" to its place in the sky. Convair, which is working on the Atlas intercontinental missile, and thus stands to gain much needed information from the satellite, will surely participate to some degree. And Martin, which has had a special group of engineers studying the space problem for many months, will undoubtedly also be consulted.

• **Moneywise,** the earth satellite project, scheduled for 1957-58, cannot mean too much to any company. Cost has been estimated at about $10 million.

Meanwhile, Norman V. Petersen, guided missile expert of the Sperry Gyroscope Co., Div., The Sperry Rand Corp., predicted that unmanned space ships will reach the moon "within 20 years." His statement followed a prediction of Frederick Durant, president of the International Astronautical Congress, that manned space ships will be on the moon at the end of the twentieth century.

• **The British** Royal Aeronautical Society announced Britain's entry into the international "race" to explore outer space. However, it was admitted by British scientists that America, with its strong lead over Britain in such matters, may beat the British to the punch.

The British announcement came only a few days after Russian scientists said that they were planning a project similar to the one planned by the United States. The accounts carried hints that the Soviet development was larger than the American satellite project and that it might be launched ahead of ours.

The space scientists at the Copenhagen meeting also heard Kraft Ehricke, a German V-2 rocket expert now employed by Convair, suggest a plan for a "satelloid" space ship powerful enough to observe the planet Venus from close range. Ehricke said that the power-driven satelloid would be a considerable advance on the official United States project and would prepare the way for interplanetary travel.

• **The German expert** said the satelloid would have a power unit that would go into operation when the vehicle reached a height of between 75 to 95 miles. This, he said, would enable it to approach other planets and obtain the data needed for piloted flights.

The space congress also listened to Darrell C. Romick, past president of the Cleveland-Akron section of the American Rocket Society and member of the National Space Flight Committee, predict that unmanned space ships circling the earth at 300-mile altitudes and serving as springboards for flights into outer space are much nearer to realization than is imagined.

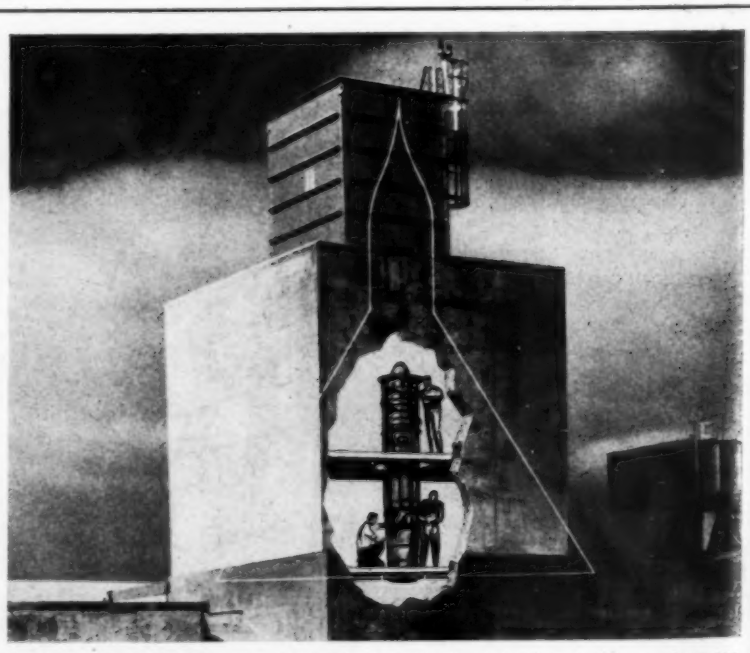
Romick, who is a member of the missile project staff of Goodyear Aircraft Corp., also made recommendations for the establishment of appropriate college level study courses to help prepare space travel scientists for the near future.

Meanwhile, it has become known that the American plan for launching the artificial "moons" in their orbits will be developed by the National Research Council of the National Academy of Sciences. Various phases of the program will be handled by 12 technical panels reporting to the U. S. National Committee for the International Geophysical Year. A Federal appropriation for the satellites will be administered by the National Science Foundation. A preliminary estimate for the project cost is $10 million, excluding the propulsion units for firing the satellites.

The Defense Department will provide equipment and facilities for accomplishing the launching task. As early as December 1948, the late James V. Forrestal reported that an "earth satellite vehicle program" was being carried out independently by each military service coordinated by the Committee on Guided Missiles.

• **Prominent among** satellite planners is Maryland University's physicist Dr. F. S. Singer, whose plan for a satellite was presented at the Institute of Radio Engineers Convention in March, 1955, and the American Rocket Society meeting in Baltimore in April, 1955. At that time Dr. Singer said launching, control and instrumentation of his satellite, called MOUSE (Minimum Orbital Unmanned Satellite of the Earth), is well within the range of present techniques.

Dr. Singer earlier had proposed a cheap rocket costing about $900 to be launched from aircraft operating at 50,000 feet. That point is above 90% of the atmosphere. Most of the initial drag would be eliminated and altitudes of 200 miles seemed feasible. Since



RYAN AERONAUTICAL will test the jet engine for its VTO plane in this new $175,000 research facility at the company's San Diego plant. The cell can test high-rated jets either in horizontal or vertical attitudes. Ryan's jet-powered vertical takeoff aircraft for USAF is scheduled to fly before year's end. Powerplant is a Rolls-Royce Avon.

then, it is believed Dr. Singer has been working with instrumentation for upper atmosphere vehicles.

The general plan for MOUSE calls for a spherically shaped vehicle, weighing about 50 pounds, carrying outrigger tubes containing gamma, cosmic, and aurora ray counters. Bell Telephone Solar cells mounted inside the sphere would collect solar energy through a transparent lens on the outside of the sphere to provide power to telemetering equipment for sending measured and observed information to Earth.

• **A gyro-orientation system** would keep the lens pointed toward the sun at all times. According to Singer, if the rocket bearing MOUSE were launched to describe an orbit over the North and South Poles, and if the final stage of a three-stage rocket bearing MOUSE were used to accelerate the vehicle to about 17,280 miles per hour, the sun would always be visible to the solar cells for power generation.

The orbital axis of a Polar circling satellite would be nearly at a right angle to the earth's axis of rotation. This would mean MOUSE would be observable at all times in sunlight from some point on Earth. Continuous collection of data would require the cooperation of scientists in all parts of the world. • • •

MORE B-52s COMING UP. Recent photo at Boeing Field, Seattle, shows 12 Air Force B-52 bombers being readied for first flight and delivery to operational service. First B-52 went to Strategic Air Command at Castle AFB, Calif. late in June. Up to 500 will be delivered by 1958 as a result of recent AF decision to boost production by 35%.

Talbott Case Focuses Spotlight On Businessmen in Government

By FRANCIS KEENAN

The case of Harold E. Talbott, who was forced to resign as Air Force Secretary, may have been the most dramatic of recent developments in the never-ending controversy over businessmen in government.

It was not, however, necessarily the most significant. For the Talbott affair was essentially a simple matter. There was little if any dispute about the basic facts: that Talbott, while Air Force Secretary, wrote letters on official stationery, made telephone calls from the Pentagon, and spoke to business acquaintances about the services performed by a private firm in which he maintained an active interest.

The issue was recognized by most as one of propriety. And it was resolved on that basis. President Eisenhower pointed out strongly there must be no question about the ethics, as well as the legality, of a public official's performance in office. It was clear that the President considered that even the possibility of using one's official position to favor one's private interests must be avoided.

The Talbott case served to focus public attention more than ever on this phenomenon of big Government—and in ethical terms. And it added fresh significance to other, less dramatic, developments that have taken place in recent weeks on Capitol Hill in this area.

• **Most significant** of these, perhaps, has been the long controversy over the conditions under which "without compensation" — WOC — employes should continue to serve with defense-related federal agencies.

The issue arose in congressional consideration of the Defense Production Act, when the President's program included continuation of the exemption from conflict-of-interest statutes for special, temporary employes permitting them to continue to be paid by their regular employers.

The Senate Banking Committee, prodded by Sen. Wayne Morse (D-Ore.), inserted a provision withdrawing the exemption for WOCs serving in, or functioning as, bureau, division or section heads. It permitted their continued use as consultants or advisers.

The Morse amendment aroused a great deal of heat when the legislation reached the Senate floor. There, Republicans managed to round up one more vote than did Democrats, and the Morse proposal was killed on a straight party-line vote, 46 to 45.

In its place, the Senate adopted the Capehart amendment allowing WOCs to hold administrative jobs, but requiring that they clear policy matters with a full-time, salaried Government employe who would make the decision.

• **Meanwhile, the House** Banking Committee had added a further check on the WOCs by requiring that they file monthly reports of their business connections and financial affairs with the head of the employing agency. In conference, members accepted the House language, as well as the Capehart amendment—only to have it returned to a second conference under Senate instructions to delete the House amendment.

As a compromise, with adjournment in the offing, conferees modified the provision to require less detailed reports every six months and publication of the reports in the Federal Register.

• **The spirit** of the dispute might be summarized in the words of two of the principal protagonists, Senators Morse and Capehart. Urging recommittal of the bill to delete the conference language, Capehart argued, "I think possibly the Eisenhower administration can get along without the services of these persons.

"But I am appalled at the very idea that the United States Congress would even attempt to amend the law in such a way as to say to such persons, 'You must list your liabilities and your assets every three months.' Mr. President, the philosophy of any such proposal is bad. We ought not begin such a procedure."

Morse replied a moment later, "My position is simply that I do not think the criminal statutes in reference to conflicts of interest should be waived when

a man comes into Government service, and occupies a position in which it is possible for him to render judgment and make policies, when at the same time he receives pay from a corporation, a labor union, or a farm organization. We think that in peacetime we ought to scrutinize very carefully the decisions such a person makes, and we ought to have a full disclosure as to his sources of income."

Even though the Congress has adjourned, the debate continues. In the House, Rep. Emanuel Celler (D-N. Y.), chairman of the Judiciary Committee's Antitrust subcommittee, has trained his sights on the Department of Commerce's Business Advisory Council and the whole problem of WOCs serving the Government. Celler, whose hearings will continue during the recess, seeks to determine how "public-minded" business advisory groups have been, or whether private interests have been served through participation in such groups.

• **Celler has also charged** that executive orders governing the employment of WOCs have been "blatantly ignored," that defense agencies have too freely used them in policy positions despite statutory requirements that full-time, salaried Government personnel be assigned policy responsibility.

The other side of the coin was turned up recently when Rep. Robert H. Mollohan (D-W. Va.) warned that too many generals and admirals have been brought into "top policy making and administrative positions" in industry and government. Concerned that the military was "encroaching" into traditionally civilian areas of national life, Mollohan also raised the question whether the former officers were not in a position improperly to bring their influence to bear on behalf of their new employers.

With businessmen and industrialists going into Government, and with top Government officials going out—only to return seeking business—Washington's concern at the situation reached a peak. • • •

Stroukoff 'Pantobase' Can Operate From Land, Water, Sand, Ice or Snow

Air Research and Development Command last month demonstrated a land-based assault and cargo aircraft with hull and landing gear that provide combat and logistic ability on water, sand, snow, ice and unprepared natural surfaces.

At Mustin Field, Naval Air Station, Philadelphia, Stroukoff Aircraft Corp.'s "Pantobase" YC-123E twin-engine plane showed its capabilities. It took off from one of the runways, landed in the Delaware River and made several takeoffs and landings from water. Then, without using beaching gear, the aircraft taxied up a seaplane ramp onto land.

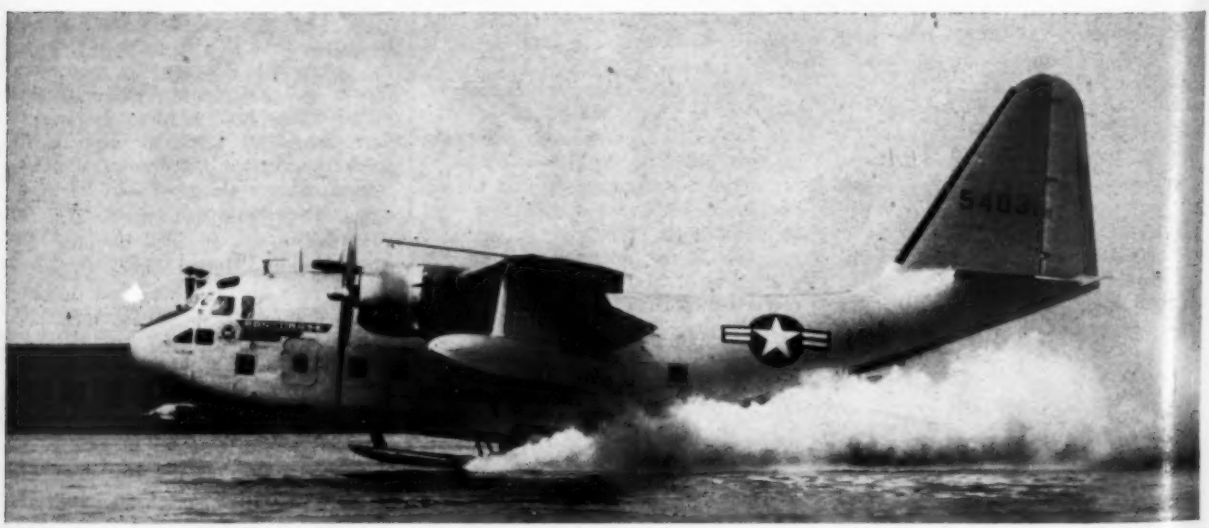
When the "Pantobase" (meaning "all base") gear craft is combined with the previous "D" model with boundary layer control, as Stroukoff is doing in an Air Force order for six more planes, the company believes it will have a most versatile aircraft capable of making short approaches or takeoffs from beaches, swamps, inland lakes and arctic terrain, as well as other fairly smooth natural surfaces. Stroukoff officials said the Navy is interested in its design and is in the dickering stage.

• **The Stroukoff plane** has wing tip floats and looks like a seaplane but basically it is the C-123 landplane hull sealed for flotation with two heavily stressed land and water skis tucked up underneath its hull. The craft also has retractable nose and main landing gear for runway operation.

In water the skis are lowered and, at a speed of about 20 mph, the skis surface by means of airfoils on their sides and skim across the water until flying speed is reached. Stroukoff officials said that a pilot in doubt about the terrain beneath him could depend on the skis for a landing under almost any conditions.

Despite the added gear, the YC-123E's cruising speed is cut only about 2% and it is able to maintain a cruising speed of 179 mph on its two Pratt & Whitney R2800 engines. The plane retains all its assault transport characteristics. It is capable of carrying 60 troops or a useful load of nine tons and has straight-in tail loading at truck height with a tail ramp.

Interest of the other services in the Stroukoff plane was shown by the attendance at the tests of Army and its Airborne Corps, Marine Corps and Coast Guard, as well as Air Force and Navy officers, including members of the AF Troop Carrier Command. • • •



Stroukoff's 'Pantobase' YC-123E showed wide range of takeoff and landing capabilities in demonstration.

TWA's fleet of Constellations gets a newcomer . . . the Super G Constellation, last word in luxurious, efficient air travel. At the same time the entire fleet welcomes another newcomer . . . Fluoroflex-T propeller feathering lines and their extra safety.

Having passed CAA fire tests for feathering lines, these new hose assemblies are approved for commercial aircraft use. Their compression-type fittings are blowout-proof.

Fluoroflex-T feathering lines have the same Teflon®-compound tube used in R-3800 fuel and oil lines which are being adopted in so many of the new jets and turbo jets. More and more you'll see Fluoroflex-T hose assemblies specified where lines are subject to severe temperature and service conditions. Send for full information on types available.

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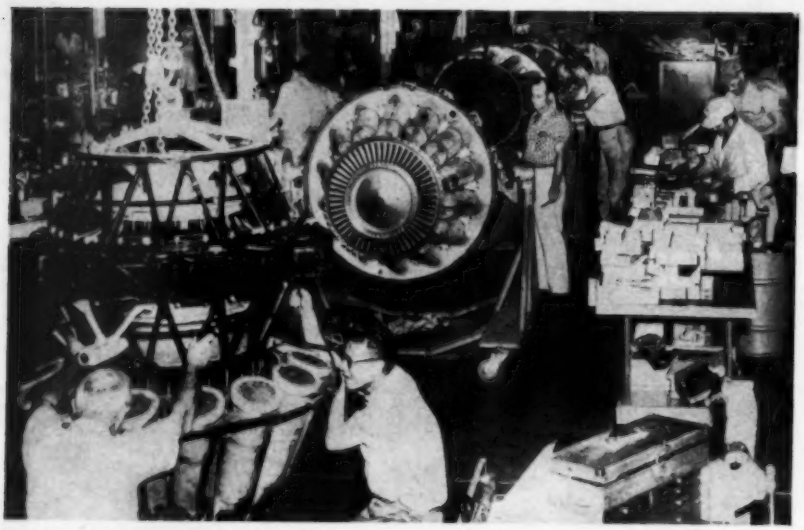
P.S. Resistoflex also manufactures specialized industrial hose assemblies, plastics products such as Teflon, Kel-F and Fluorothene rod, sheet, tube, parts, electrical sleeving, spiral back-up rings.

Southwest Airmotive Fulfills Quota For First Month of J33 Overhaul Job



FIRST 10 JET engines ever overhauled by a civilian non-manufacturer for the Air Force move down the final assembly line at Southwest Airmotive's new expanded engine facility at Love Field.

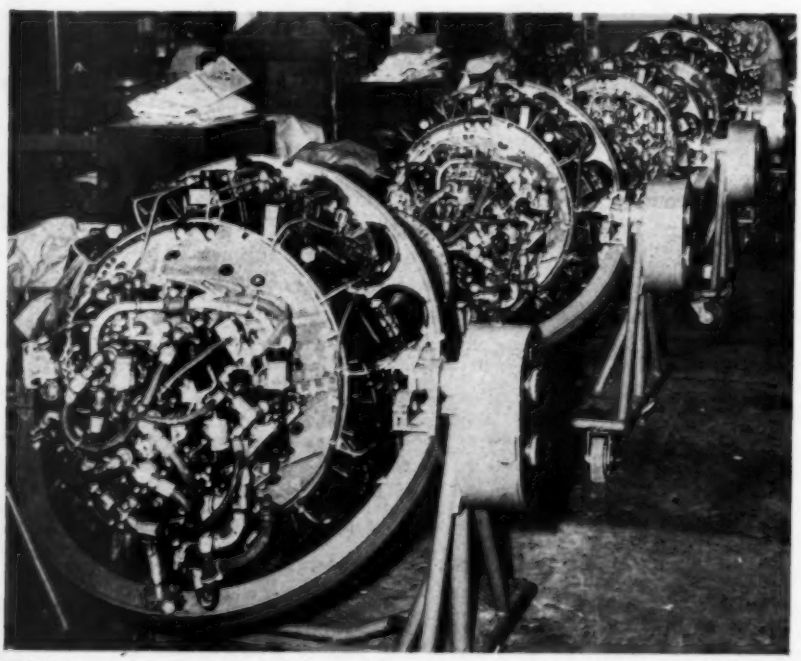
Southwest Airmotive overhauled 10 Allison J33 engines and delivered them to the Air Force the last week in July, fulfilling its initial monthly quota under terms of its $3-million contract for overhaul of more than 1200 of these engines.

The on-schedule production announcement followed the company's successful race to complete its $1-million tooling and expansion program to accommodate the first jet-engine overhaul contract (AMERICAN AVIATION, August 1) ever awarded to a non-military, non-manufacturer base.

The first engine came off the line and was accepted by the Air Force 150 days after the company had received its AF contract in finalized form. A large group of Air Force technicians and inspectors were on hand as No. 1 was put through testing phases at Southwest Airmotive's new testing facilities at Amon Carter Field in Fort Worth.

The production line at the main plant at Dallas' Love Field is gaining momentum daily, company spokesmen say, and will be in full swing within a relatively short time. Approximately 350 persons will be employed in the engine division when peak production is reached, with about 60 of them assigned to the test operation at Carter Field.

James Wall has been placed in charge of jet operations at the Love Field plant under Louis Beimer, superintendent of the engine shop. James E. Mays, formerly a jet engine specialist with the Oklahoma City Air Materiel Area, has been retained by Southwest Airmotive to head the test unit. Overall supervision of the jet program has been handled by James E. Lockhart, Jr., vice president in charge of service, with George Kelley, plant facilities engineer, directing engineering detail. • • •



NEXT STEP for the overhauled J33s, shown on final assembly line, is intensive run-throughs.

Detroit Flyer Wins Soaring Championship

Kemp Trager of Detroit won the 22nd National Soaring Contest championship at Harris Hill, Elmira, N. Y. July 2-14 although he finished second in the point standings to Commander H. C. N. (Nick) Goodhart, British Naval attache in Washington. Under contest rules, the title can only go to an American citizen.

Trager scored 1,038 points compared with 1,081 for Goodhart. In third place, only two points behind Trager, was Robert Smith of Ulster, Pa.

Twenty-eight pilots flew their sailplanes a total of 15,468 miles during the competition, three of them flying more than 1,000 miles each.

Three contestants racked up greater mileage totals than the new champion. Goodhart covered 1,077 miles; Bill Ivans of LaMesa, Calif., 1,070, and Paul Schweizer of Elmira, 1,034. Trager flew 968 miles.

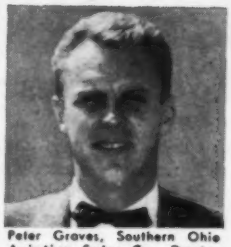
During the Independence Day weekend, before the contest got under way, the 25th anniversary of motorless flight in Elmira and of the first national glider meet were commemorated.

Stan Smith of Lyndonville, N. Y., 1933 national champion, flew 208 miles to Huntington, Mass., on opening day.

Highest altitude reached: more than 19,000 feet by Clarence See of Baldwinsville, N. Y., flying a Schweizer 2-25.

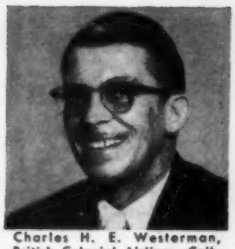
Gene Hudman, Stonnell and Holladay Aircraft Sales, Carolina Division, Municipal Airport, Charlotte, North Carolina.

Herrol Bellamy, L. B. Smith Aircraft Corp., Miami International Airport, Miami, Florida.



Peter Graves, Southern Ohio Aviation Sales Co., Dayton Municipal Airport, Vandalia, Ohio.

H. Leibee Wheeler, Buffalo Aeronautical Corporation, Buffalo Municipal Airport, Buffalo, New York.

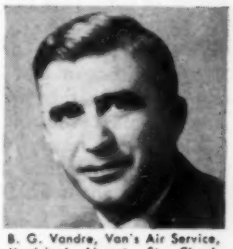


Charles H. E. Westerman, British Colonial Airlines, Calle Lopez No. 1 — Despacho 502 Mexico, (1) D.F., Mexico.

John A. "Jack" Baumann, Santa Monica Aviation, Santa Monica Airport, Santa Monica, California.

AERO DESIGN *Commander*

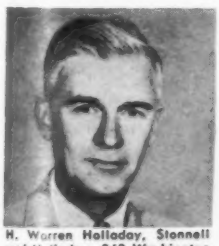
NATION-WIDE SALES AND SERVICE ORGANIZATION



B. G. Vandre, Van's Air Service, Municipal Airport, St. Cloud, Minnesota.

Don Vest, Vest Aircraft & Finance Co., P. O. Box 5306, Sky Ranch Airport, Denver, Colorado.

Lucien M. Taillac, Trans-Aire Corporation, Pan-Air Building, New Orleans Airport, New Orleans, Louisiana.



H. Warren Holladay, Stonnell and Holladay, 843 Washington Building, Arlington Towers, Arlington, Virginia.

Robert F. Wood, Newport Air Park, Newport, Rhode Island.

Louis Humphreville, Executive Aircraft Corporation, Municipal Airport, Pontiac, Michigan.

Art Meurer, Arthur Meurer Co., Inc., LaGuardia Field, New York, N. Y.

Max R. Brand, Aero Commander Dist. (Downtown Airpark), Hangar 3, Municipal Airport, Tulsa, Oklahoma.

O. B. Callen, National Aero Sales Corp., Midway Airport, Chicago, Ill.

John Wilsdon, Executive Flying Corporation, P.O. Box 122, Lambert Field, St. Louis, Missouri.

A. M. "Sime" Bartolet, Reading Aviation Service, Inc., Municipal Airport, Reading, Pennsylvania.

W. H. "Bill" Buchanan, Sales Manager, Johnsons Air Interests, Inc., Horlick-Racine Airport, Racine, Wisconsin.

L. S. McIntire, Aero-Tex Corporation, 3300 Love Field Drive, Dallas, Texas.

NATION-WIDE SALES and SERVICE

AERO DESIGN *Commander*

AERO DESIGN AND ENGINEERING COMPANY

TULAKES AIRPORT • OKLAHOMA CITY, OKLAHOMA

Circle No. 10 on Reader Service Card.

Air Force Plans for 1956 Worry Maintenance and Overhaul Industry

By LOIS C. PHILMUS

The private maintenance and overhaul industry is showing increasing concern over Air Force plans for contract maintenance in fiscal 1956. Fears were touched off recently when the Air Force recalled bids in order to review its overall program.

The review is necessary, an Air Force spokesman told AMERICAN AVIATION, because the work load far exceeds funds available. Congress has appropriated nearly $265,000,000 for contract maintenance in fiscal 1956, an increase of about $20,000,000 over 1955 but, it is pointed out, the requirements have increased far beyond this level.

• **The industry's belief** that the Air Force may feed more work into the prime manufacturers appears to be partially justified. It is understood that a program for sending newer types of equipment, i.e., F-100 and B-47, back to the manufacturers for modifications, maintenance and overhaul, while the AF depots take on older types, is under consideration. This, it is felt, would cut appreciably the dollar volume remaining for other contract maintenance work.

Part of the Air Force's contract maintenance policy is to keep manufacturers' assembly lines rolling with modification and maintenance work when manufacturing work tapers off in order to keep them in top production status.

The work load of some of these has been "dropping off considerably," Col. Keith Dech of the Air Force Program Planning Section told AMERICAN AVIATION. The Air Force therefore intends to feed modification work to this group, that might have previously been handled in Depots, where the combined forces of engineering and manufacturing capability for producing modification kits are needed.

Colonel Dech emphasized, however, that straight contract maintenance and overhaul will continue to be awarded on the competitive bid practice.

• **Some cuts** in this program are "seen likely" by Harold C. Stuart, president of the Aircraft Service Association and former Assistant Air Force Secretary, who expects some "rather substantial changes" if the depots take on doing some of the older equipment. It appears likely, he observed, that "we won't get the program expected or anticipated."

He noted that the military "should not be in competition with civil" industry in the program. Better continuity, he said, can be achieved through wider, rather than less, use of the M&O firms, which are essential to the Defense."

Stuart had no argument with Air Force policy to use prime manufacturers for modifications of new aircraft, but "when a plane gets finalized," the M&O firms are equally capable of taking over, he said. He feels that many of the manufacturers are not interested in getting in the "garage business."

• **Stuart sees no reason** why the M&O's cannot take on newer types of aircraft and engine maintenance, rather than being restricted to maintaining and overhauling long used models. Many of the firms are financially and technically capable of tooling and providing such services, as Southwest Airmotive on its J33 jet engine overhaul contract.

The Association would very much like to see a firm long-range policy that would eliminate the "peaks and valleys" the M&O's faced in their military contract work. A firmer program, it is felt, would insure the financial strength and efficiency of the industry.

• **Also of great concern** to the ASA is the so-called Sikes Amendment or Section 638 of the new Defense Department appropriations bill. It stipulates that work traditionally carried on by civilian personnel in Defense should not be contracted out to private industry without Defense justification, provided to Congress 90 days prior to making the transition.

ASA represents eight of the large aircraft service firms, including Lockheed Aircraft Service, Inc. and subsidiaries; Pacific Airmotive and its Pacair division; Grand Central Aircraft; Temco; Southwest Airmotive; Spartan; Aero & Engine Manufacturers, subsidiary of Trans Ocean; and L. B. Smith. It was organized a little more than a year ago. • • •

Air Force Funds for Contract Maintenance
(1954-1956 Fiscal Years)

	1954	1955	1956
Depot maintenance:			
Aircraft maintenance	$102,674,340	$122,827,000	$141,195,000
Aircraft engine maintenance	23,228,605	34,170,000	43,180,000
Aircraft & A/E accessory maint.	22,447,812	31,861,000	32,584,000
Electronics and communications equip. maint.	12,102,299	11,775,000	19,073,000
Ground-powered and marine equip. maint.	10,981,108	11,313,000	7,152,000
Other equipment and materiel maintenance	14,054,282	11,082,000	18,543,000
Storage of ground-powered and other equip.	9,759,918	7,850,000	3,180,000
Subtotal depot maintenance	$195,198,364	$230,878,000	$264,907,000

SHORT SPERRIN test bed for de Havilland Gyron high-power axial turbojet made its first flight late last month. Sperrin is capable of giving the Gyron long flights at 50,000 ft. and 600 mph cruising speed. Normally the Sperrin operates two stacked Avons on right wing to balance the single Gyron, but a third Avon is retained atop larger engine as a standby powerplant.

Commerce Dept. Announces Plans For Administering Airport Aid

Department of Commerce moved quickly in announcing plans for administering the $231,500,000 airport contract authorization act, following signing of the measure by President Eisenhower shortly after Congress adjourned. The contract authorization law coupled with the $20 million appropriated for federal aid in the CAA budget provides for a $251,500,000 program for the next four fiscal years.

Secretary of Commerce Sinclair Weeks, after revealing that spending plans for the $20 million were "virtually completed," said programming for the $42,500,000 authorized for fiscal 1956 under the new law would be undertaken around the first of October to provide a 90-day period for sponsors to submit new or amended applications. (The act further provides that $63 million is authorized for each of the three succeeding fiscal years).

•**Noting that the new law** will be administered by the Civil Aeronautics Administration, Weeks said a "thorough review" of the present programming and priority standards was being undertaken immediately "in order to determine the most equitable basis" for administering the increased program. Interested groups, it was said, would be consulted on the development of the new policies and procedures.

The law, in addition to providing the increased funds, makes it clear that Commerce "is not to consider ineligible for federal aid the development of any class of public airport; the construction, alteration or repair of airport terminal buildings or the accomplishment of any other type of airport development eligible under the Federal Airport Act," according to a statement by the Senate Commerce Committee made after the bill became law.

The statement said grants are to be made "within the limits of available authorized funds, for all legally eligible types of projects to the extent that they are determined to be necessary to meet the needs of civil aviation, on a case-by-case basis."

•**The law also extends** to two fiscal years the time within which apportioned funds shall remain available for use only in the states for which they are apportioned.

Secretary Weeks pointed out that the new law will enable sponsors to present long-range airport plans based upon thorough studies of existing and future needs. "The new law," he said, "will permit earlier programming of each fiscal year's authorization, and in some cases entire projects can be programmed with assurance that stated amounts of Federal funds will be available in succeeding years."

The Commerce transition to new program standards will not be reflected in the programming of the $20 million which will be based on "presently existing program standards" in order not to delay its allocation.

The 90-day grace period for the $42.5 million, in addition to giving sponsors a chance to make application, will also permit CAA to develop revised administrative standards.

•**The Department** feels that "it will be necessary for CAA to develop with sponsors more adequate information regarding their construction and financing plans, and other pertinent aspects of their operations."

Observing that some cities have firm long range plans, while others do not, the Department policy states: "Since all cities are not equally prepared at this time with firm future plans, advance Federal commitments on an individual basis might give an undue preference to some cities, and preclude a subsequent opportunity to weigh the relative merits of all applications."

Therefore, the Commerce Department, as a general principle, feels "that the advantages of advance programming can best be obtained on an overall basis, by simply moving forward to an earlier date the annual process of receipt, review and tentative approval of all project applications. This would give all local sponsors a longer period in which to raise funds and take other preliminary steps, and would make it possible to enter into firm grant agreements promptly at the beginning of each fiscal year." • • •

THREE FIRSTS IN CROSSWIND landing gear development are marked in this photo of production Boeing B-52 in taxi run at Seattle. It represents first use of gear on production jet aircraft, first production use on military aircraft and first use on a heavy bomber. Cross-wind gear has been adopted as standard on all Seattle and Wichita B-52 production aircraft.

F-102 to Test Lights at Supersonic Speeds

The aeronautical direction lights developed by Transocean Air Lines for commercial transports may also turn out to be what the military seeks for navigation lights for high-speed jets.

TAL is now at work on an application for position lights, which Convair will test on its F-102 to determine how effective they may be at transonic and supersonic speeds.

• **TAL developed** its exterior lighting system for airliners as an anti-collision warning device. It now prefers to refer to the new-type illumination as direction rather than collision lights because they show position, movement and altitude of an airplane and can't be confused with bright stars or lights on the ground.

TAL tried out the so-called "leaping lights" on a DC-4 for more than 1,000,000 miles of flight testing under all degrees of visibility. United Air Lines is now testing an installation in line operation on a DC-6 coach.

Following tests on a Morrison-Knudsen Co. executive DC-3, the lights were approved by the CAA for DC-3s and AiResearch Aircraft Service announced it was prepared to install them on corporate aircraft. U.S. Steel is to install the lights on its new Viscount turboprop executives.

• **Called "Madsen Lights"** after Capt. Andrew Madsen, TAL's director of research and development, who devised the system, the seven sequenced flashing 800,000-candlepower gas discharge lights are installed on the top and bottom of the fuselage and even in broad daylight are visible for several thousand feet. At night they can be seen for miles.

One observer on the ground at the Santa Monica airport observed the Morrison-Knudsen DC-3 flying over Long Beach 35 miles away. Another time the illumination was observed in light rain at a distance of 17 miles.

Icy Nerves

Getting in and out of a big city on a holiday weekend, of course, calls for icy nerves and a steady hand. Traffic on the George Washington Bridge, from New York City to New Jersey, soars from its daily average of 85,000 cars to as much as 134,000 and jams have developed on Route 17, the feeder line, as far as Monticello, New York, 84 miles from the bridge. C. McKim Norton, vice president of New York City's Regional Plan Association, predicts by 1970 it will take an overnight trip to reach the open countryside. Within 15 years, he said, the New York metropolitan area will be a continous tight packed section extending 40 miles north of Manhattan and 70 miles east and west.

Excerpted from a Wall Street Journal story of June 21, 1955.

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Here Are Details of Napier Oryx, New British Turbine Powerplant for Helicopters

- **Hot gas propulsion system developed from ideas of L. G. Frise, technical director of Hunting Percival.**

By JAMES HAY STEVENS

London—The Napier Oryx "gas producer" unit is a new turbine unlike anything else yet revealed. The origin of the engine lies in ideas of L. G. Frise, technical director of Hunting Percival Aircraft Ltd., who, some five years ago, conceived a system of hot gas propulsion for helicopters.

This system is neither compressed air (SNCASO Djinn) nor tip combustion (Fairey Rotodyne), but a stage between the two. The key to this plan lies in achieving a high thermal efficiency, so obtaining a good specific consumption at low altitude, and using low-pressure, medium-temperature gas with a large mass flow.

Because of the large mass flow, the Frise plan involves the use of larger ducts than does the delivery of high-pressure air to rotor tips. In the P-74 helicopter, due to fly this year, a thick-section, laminar-flow airfoil is used for the rotors to give ducting capacity for the propulsive gas.

Because of the gas delivery temperatures, the rotor has to be made of steel—so insuring a good fatigue life. The greatest bonus, however, comes from the fact that the rotor is automatically de-iced at all times, the gases being delivered at around 640-680° K.

• **D. Napier & Son** of Acton, England undertook the design of a "boiler" to supply the propulsive fluid for this new helicopter. The engine being designed by A. J. Penn, who was responsible for the familiar Eland turboprop.

The power required, the equivalent of 750 hp, involves a tiny engine a little more than one and a half feet in diameter and seven feet long—including accessories. The main compressor, which has twelve stages, sucks air through an annular intake and delivers it to a diffusor which feeds the five combustion chambers.

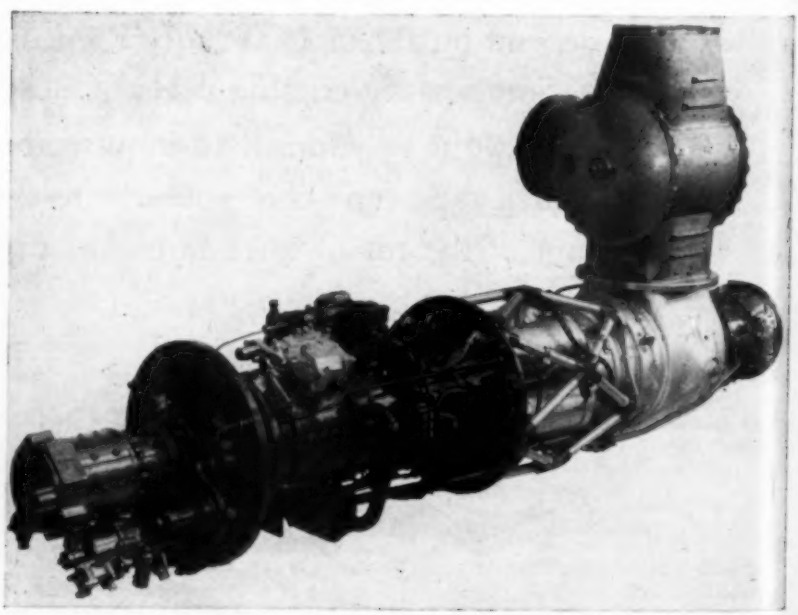
Characteristic Napier upstream injection is used, which keeps down the overall length and is very efficient at weak mixtures. The gases deliver into a two-stage reaction turbine with an expansion ratio of 3.14:1. These turbine characteristics were chosen because of the back-pressure due to the gases mixing with the air delivered from the auxiliary compressor.

The exhaust gas is delivered into a stainless steel collector box containing cascade vanes which turn the gases up 90 degrees. Through the center of this box there is a sleeve, which allows an extension shaft from the main compressor/turbine shaft to pass through to the auxiliary compressor.

• **The auxiliary compressor** has only four stages, giving a pressure ratio

Technical Highlights of the Oryx

- Compressor diameter is less than nine inches.
- Compressor blades are aluminum-bronze.
- Final stage of main unit has blades only half an inch long with 1:1 aspect ratio.
- Blades are "fir-tree-mounted" in steel disks, which are bolted together to form drum. There is no actual compressor shaft.
- Compressor casing is magnesium alloy.
- Turbine rotor disks are Napier nickel-steel.
- First-stage turbine blades are Nimonic 90, second-stage are Nimonic 80A. Attachment is by fir-tree roots.
- High-energy spark ignition is used in two flame tubes.
- Turbine rotor disks and bearings are cooled by air bled from the sixth stage of the main compressor.
- Compressor bleed is also used to balance end thrust of compressor due to lack of ram head.
- Compressor bleed will also be used to cool the helicopter rotor hub bearings.
- Turbine shaft section is joined to main compressor by a serrated coupling shaft and to the auxiliary compressor by a gear-type coupling.
- Accessory drive is by a quill shaft from the main compressor.
- Accessories on front plate are: fuel pump, oil pressure/scavenger/pump, rpm generator, plus a spare mounting space.



GENERAL VIEW of Napier Oryx taken from main compressor end. Non-throttling valve dumping nozzle faces away from camera.

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—U.S. Supreme Court

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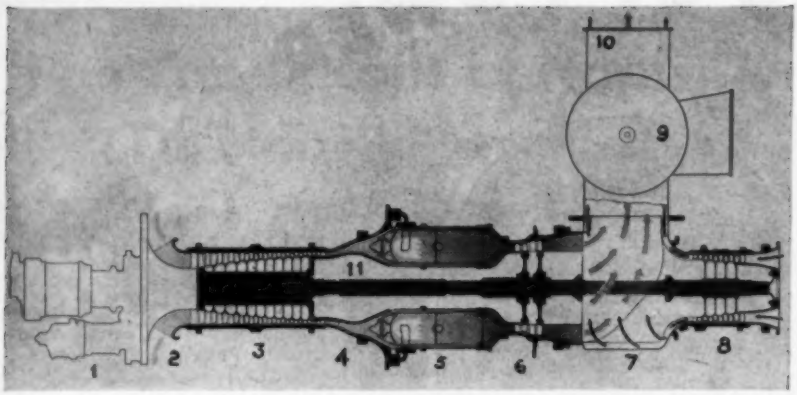

SIMPLIFIED CUTAWAY and gas-flow diagram of Napier Oryx. Air enters 12-stage main compressor (3) through annular intake (2) and passes through diffuser (4) into combustion chambers (5) with upstream fuel injection. Hot gasses pass through two-stage turbine (6) into collector box (7) and up through non-throttling valve (9) to delivery duct (10). Four-stage auxiliary compressor (8) on common shaft (11) delivers air to outer passages in collector box (7) so forming insulating cool-air "sheath" that continues through non-throttling valve and up duct.

Diagram shows Oryx layout for mounting in roof of P-74 helicopter, with dumping nozzle facing aft. In present layout, non-throttling valve is turned 90 degrees to dump outward. Roof mounting of Oryx was abandoned because short ducting to rotor hub was insufficient to allow gas flow to settle and also caused back pressure from rotor to interfere with engine running.

of 1.8:1 and a mass flow of 5.1 lb/sec. It delivers into an annular duct which, in turn, feeds into the collector box.

An ingenious feature is that this cold air passes through mural passages in the collector, so forming a cold air "sheath." Not only does this help cool the inner exhaust gas ducting, but it insulates the airplane from heat. When it leaves the collector box, the cold air continues up the duct wall to the rotor hub before it has absorbed the heat of the exhaust gases.

Above the collector box is a two-position, non-throttling valve. This is simply a by-pass (or dumping) system to enable the engine to start without back pressure from the rotor. It is akin to the ground fine pitch on a turboprop. It is a barrel valve which diverts the propulsive fluid out of a hole in the side of the fuselage while starting.

In the "starting nozzle" there is a butterfly valve which, at first opened for starting, is closed once the engine is running and gives the same back pressure as the rotor. Then, when the non-throttling valve is turned to deliver to the rotor duct, there is no change in flow characteristics. Without this butterfly "choke," release of the gases into the duct would cause pulsation and "organ-piping"—possibly even structural damage.

• **The Oryx engines** have completed nearly 1,500 hours bench running and have also been used on the P-74 rotor spin rig at Hunting Percival's Luton plant. A 150-hour official type test will be attempted in the fall at the present 750 ghp rating. After this the program is to go to 825 ghp, with a target of 900 ghp by the end of 1956. From an inspection of stripped engines in the Napier plant, the writer would say that the Oryx looks remarkably sound, both mechanically and combustion-wise.

The term "gas horsepower" needs some explaining. It is simply the shaft horsepower obtainable from the gases—after the non-throttling valve—by passing them through a 100% efficient turbine.

Napier says that the surge-free characteristics of the Eland compressor have been maintained in the Oryx by again designing so that optimum efficiencies are well removed from the surge line. Automatic rpm-operated variable inlet guide vanes are used on the main compressor to assist starting and so make the Oryx suitable for a gas impulse starter. There are also safety devices in the Napier hydraulic control system which cut the fuel if the engine should overspeed or the turbine overheat.

• • •

Dispute Looms Over Aircraft Markings

Prospects of another "knots and nautical miles" dispute between civil and military aviation interests are taking shape. The new subject: How civil U. S. aircraft should be marked for best identification by military interceptor aircraft.

Defense Department stand is that present top and underwing markings are completely unsuitable, and that all aircraft should carry large side-fuselage markings. Reason is that present markings make it necessary for interceptors to reduce speeds below safe maneuvering levels in order to identify civil planes flying in restricted areas, Pentagon officials say.

A CAB proposal that the military marking plan be made a requirement, however, has run headlong into wide-scale criticism from civil operators who challenged its justification. As a result, the Board has withheld further action pending further investigation.

In the meantime, however, CAB has opened the door for use of the military-recommended system by allowing civil operators to experiment with them.

Only stipulation is that they be of 12-inch minimum height and be affixed not later than July 27, 1956. Authorization for continued use will extend to the same date in 1960, unless sooner rescinded by CAB.

Mohawk Installs DME

Fleet-wide installation of Distance Measuring Equipment is under way by Mohawk Airlines. Their Convairs will get the first units, and ten units in DC-3's will follow.

Boeing jet prototype on which new Air Force jet tanker-transport is based.

New milestone in America's aerial defense system

A new milestone in the development of our aerial forces came into sight when the Air Force ordered from Boeing the nation's first jet-powered tanker-transports. These new Boeings—called KC-135s—will bring the vital tanker-transport category of aircraft into line with the jet-age performance standards already achieved by today's fighters and bombers.

The KC-135 is an advanced version of the Boeing prototype pictured above. This new craft, designed and built by Boeing to put America into the jet tanker-transport field, has performed beyond expectations. Back of its outstanding performance is Boeing's vast background of experience pioneering the B-47 and B-52 jet bombers—revolutionary planes that opened up the current era of large, multi-jet aircraft. The KC-135 benefits from Boeing's unique experience developing aerial refueling equipment and aircraft, including the building of more than 600 KC-97s.

Boeing's Seattle Division is now tooling up for KC-135 production. Already substantial subcontracts have been placed with companies from coast to coast for participation in the manufacture of this historic first fleet of jet tanker-transports. This is part of Boeing's policy of passing along to subcontractors and vendors up to 65 cents of every Air Force dollar contracted.

The company has this goal: to produce for the nation the most advanced and dependable jet tanker, at the lowest cost possible—and on schedule. This is a Boeing tradition created with such aircraft as the trail-blazing Flying Fortresses and Superforts of World War II, today's KC-97 propeller-driven tankers, and the revolutionary B-47 and B-52 jet bombers. The jet prototype has shown in intensive flight tests that the KC-135 will, like earlier Boeings, establish new, high standards of performance.

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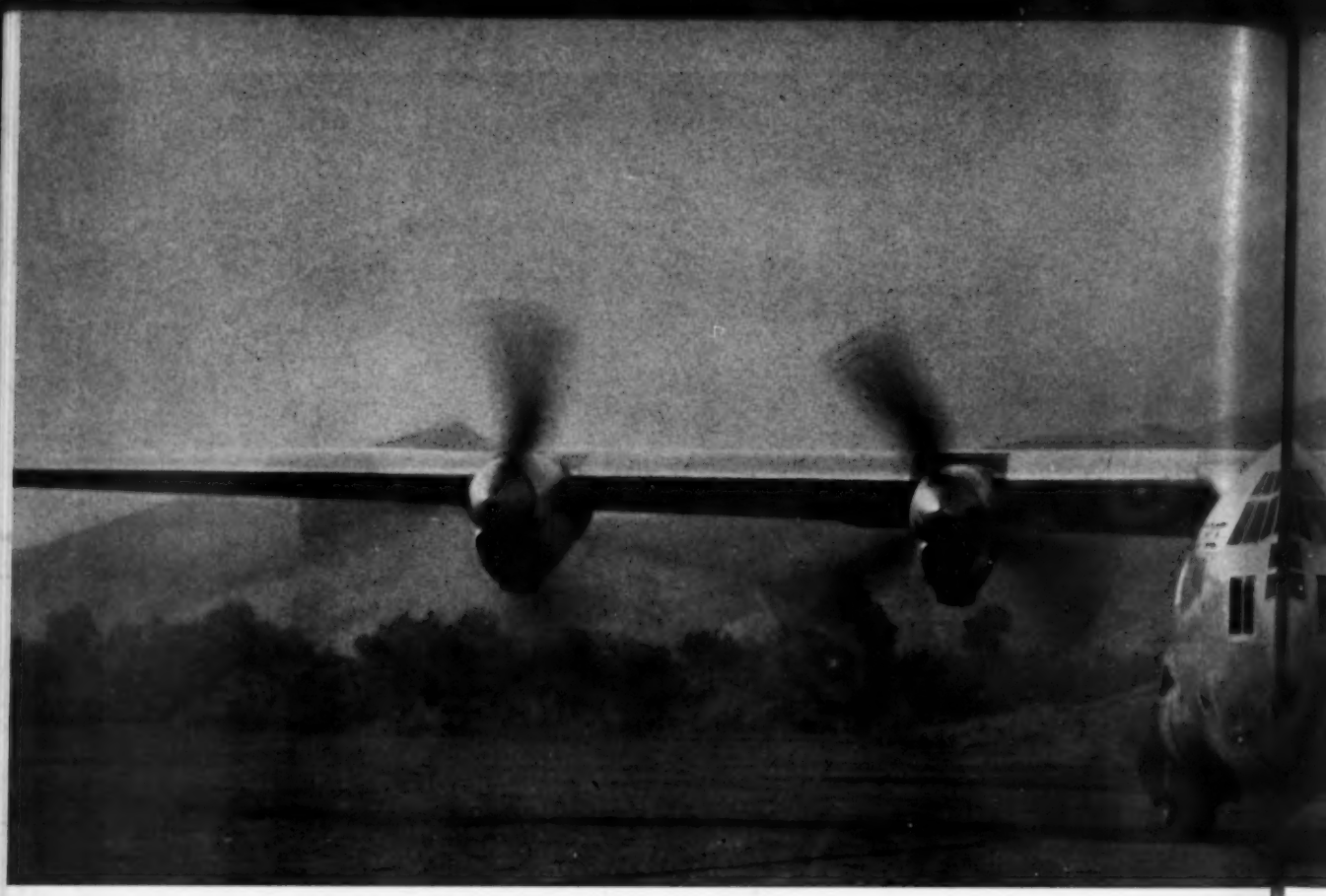


MISSION: TACTICAL AIR MOBILITY. Mobility of men and materiel is a vital problem in the new atomic era. So the Air Force needs a high-speed slung combat cargo plane that can use even short, improvised runways. The new C-130 Hercules with turbo-prop power (Allison T-56 engines) will do this. N production at Lockheed's Georgia Division, Marietta, Ga.

A Pentagon Secret

If you were in the vicinity of Alamogordo, Inyokern, Dayton, Muroc Dry Lake or Pat River, you would hear new sounds and see strange shapes in the skies. These and other m research centers are constantly testing the new flight forms developed jointly by industry a military—admirals, generals and thousands of officers and enlisted men.

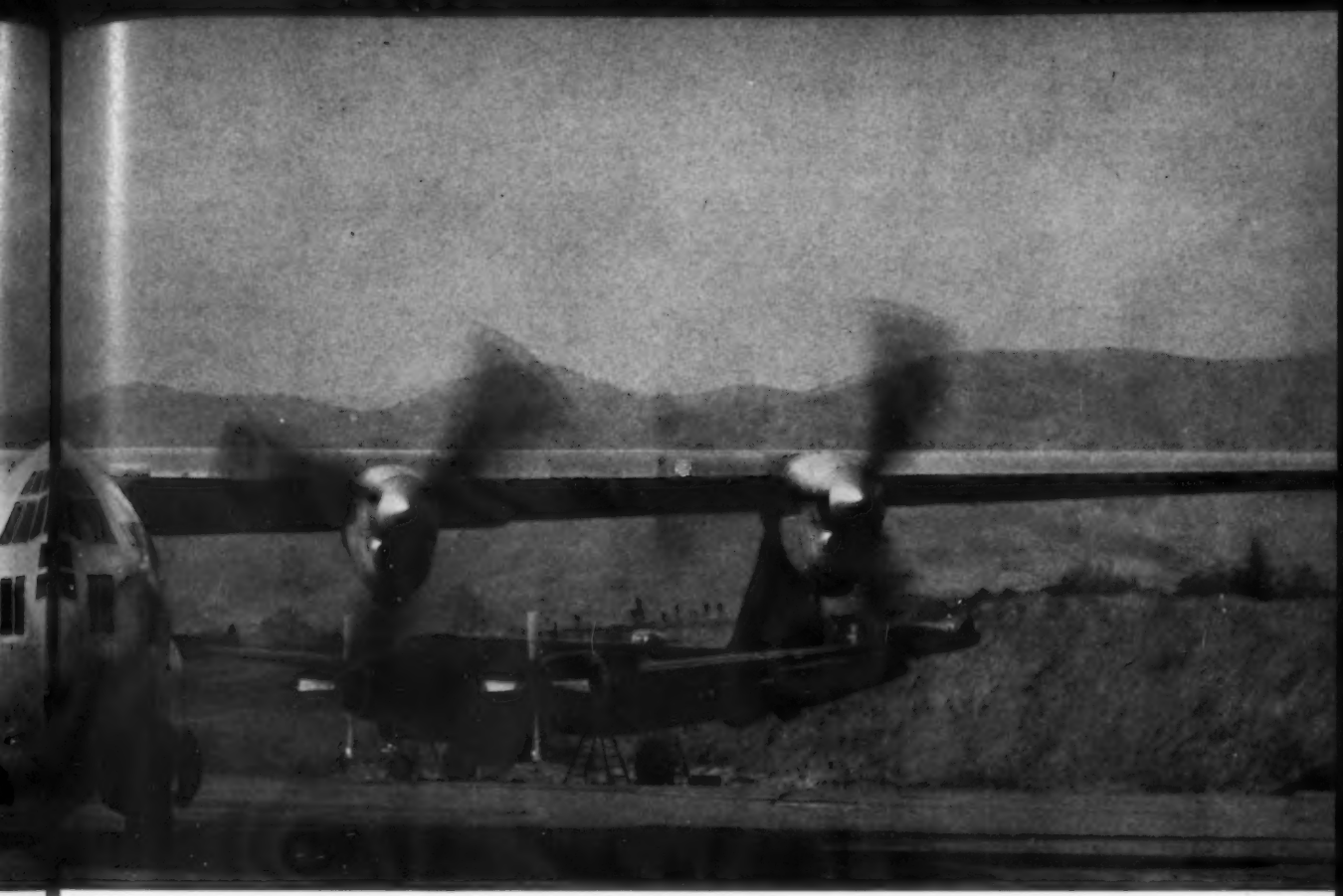
The unique talent of our military executives to mobilize science and industry is the Pen secret. In this fast-moving age, our defense needs are ever-changing. This requires new we new aircraft, and whole new concepts of defense. The job of planning and developing these i the biggest business in the world.

Each new defense device is designed to perform a special and difficult mission. And each nally presented our military executives with a major problem in planning, designing, dev ment and production. Typical of today's defense problems and the machines designed to them are the products illustrated on these two pages.

IF YOU'RE A YOUNG MAN, 17 TO 28, INVESTIGATE MILITARY AVIATION AS A CA

MISSION: POWER RESEARCH. To prove how even advanced turbo-prop engines could be used on existing air frames designed for piston power, the Navy and Air Force selected Super Constellations (below). Result: these Super Constellations are the world's fastest propeller-driven airplanes, and are now flying for our military. Lockheed is leading the industry in turbo-prop power. Look for the new Lockheed Electra commercial transport with this advanced power. Already ordered in quantity by American Airlines, this advanced airliner promises speeds up to 100 mph faster than commercial transports now in service, and amazing new operating economies for airlines. For travelers throughout the world, the Electra will provide quicker schedules, quieter comfort. Lockheed's vast experience in turbo-prop aircraft will make possible record production schedules,

MISSION: MISSILE SUPREMACY. mate goal of the research and development a heed's Missile Systems Division is a completely broadly versatile array of guided missiles. Lock MSD has more than 2,000 topflight scientists, ph nuclear physicists, engineers and technicians co virtually every field of science at Van Nuys, Alamogordo, N. M., and Patrick Air Force Ba



SSION: INTERCEPTION. (Right) This ndensation trail is a phenomenon caused by great od at high altitude—symbol of the Air Force's new 04 Fighter, the Lockheed supersonic interceptor too et to photograph.

Lockheed

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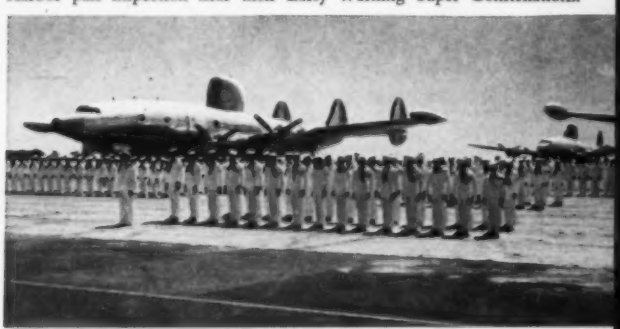
California Division, Burbank, Calif.
Georgia Division, Marietta, Ga.
Missile Systems Division, Van Nuys, Calif.
Lockheed Air Terminal, Burbank
Lockheed Aircraft Service, Burbank

LOOK TO LOCKHEED FOR LEADERSHIP

SSION: JET TRAINING. Aircraft carrie. jet ters require highly skilled pilots and, to train them, U.S. Navy needed the world's safest jet trainer. The T2V-1, the Navy's first carrier jet trainer (shown w), is a product of close Navy-Lockheed coopera- Flying about 600 mph, it can land under 100. er visibility and a raised empennage for improved rol are other new features.

MISSION: EARLY ENEMY DETECTION. Like climbing a mountain for a better view, the Navy and Air Force "go upstairs" with radar stations on Super Constellations—long-range planes capable of carrying *tons* of 360° radar. Result: more hours of earlier warning. Below, Navy crews at Pearl Harbor pass inspection near their Early Warning Super Constellations.



MISSION: COASTAL PROTECTION. No other nation has so much coastline to protect from submarine or air attack. The Navy and Lockheed have continuously developed Neptune Patrol Bombers (P2V) for this mission. In addition to high speed and long range, this plane (below) typifies Lockheed's leadership in the application of electronics to aircraft.

IAM Locals to Seek 10% Rise in Pay, Fringe Benefits; Dispersal an Issue

Aircraft locals of the International Association of Machinists (IAM-AFL) are expected to have a 10% increase in all wages, a 15% swing shift differential, and company-paid health and welfare programs high on their list of demands in their next round of contract negotiations with aircraft industry managements.

At a recent meeting of the IAM's aircraft and guided missile lodges (locals) at Wichita, Kan., general agreement was reached on these objectives. IAM officials said that individual terms, however, must be settled around the bargaining table.

Five major airframe contracts will expire at the end of March, 1956 (AMERICAN AVIATION, July 4), providing union locals with a big target and date for their demands. Three airframe contracts are currently under negotiation but their terms were not known at press time.

• **Though management has been assured** by the Defense Dept. that dispersal will not be a requirement for the aircraft and missile industries except in the case of new projects, the unions have become agitated about it and, according to west coast union business agents, dispersal is going to become a bargaining issue.

It is understood that IAM locals are going to seek contract provisions covering (1) moving expenses for employes moving with a plant, (2) reimbursement for any losses incurred in moving, and (3) severance pay for employes electing not to move with a plant. The IAM will also ask for the same or better wage structure and basic working conditions to go with a plant and its employes.

Industry opinion holds, on the other hand, that if the unions ask for the "guaranteed annual wage," or more accurately, increased unemployment compensation," they won't be able to get it." It bases this feeling on the fact that the aircraft industry is about 80% government contracted, hence its work load, with its direct effect on number of working personnel, is determined by the buying policy of the armed forces.

• **A change in the world situation** and Congressional opinion with it, causing reductions in the defense budget and consequent cutbacks in the industry, industry opinion further holds, might be financially ruinous to those companies carrying increased unemployment benefits. Wide fluctuations in aircraft industry employment were cited as lessening the possibility of the unions asking for increased unemployment compensation.

The industry is now up to a total of 750,000 personnel as compared with a pre-Korean low of 240,000 workers in 1947. How, observers ask, could the industry carry 500,000 workers on unemployment compensation if cutbacks should reduce its labor force to the 1947 figure?

Strikes, industry opinion believes, moreover, might not prove to be the way for unions to enforce their demands. The unions, realistically, prefer not to risk public displeasure by strikes which are against the government and national defense. "Because of this situation we can expect to marshal public opinion on our side," an industry official said. In a genuine emergency the government could take over the industry and operate it.

• **Industry officials** also believe that aircraft strikes would not generate the competitive force for settlement that they do in the automobile industry. The latter is a consumer industry and its officials recognize that business gravitates from struck companies, forcing them to come to terms with labor sooner in order to stay in the competitive battle.

The aircraft industry, moreover, turns out a largely non-competitive product. If Boeing Airplane Co. should be struck, for example, production of high-priority B-52 bombers would cease. It would take a rival company, even if given an immediate go-ahead, at least two years to match Boeing's current production rate.

Senate to Resume Probe Of German Air Deal

Armed with an admission by CAB Chairman Ross Rizley that CAB was "persuaded" by the State Department to be liberal in route grants to Germany, a Senate investigating group resumed its hearings this month into both the recent German controversy and the over-all business of U.S. air route negotiating practices.

The group, headed by Senator George A. Smathers (D-Fla.), heard numerous assertions from top State officials at opening hearings in late July that CAB has the "primary responsibility" for routes which are contained in bilateral air transport agreements with foreign nations.

Following State's presentation, however, Rizley testified that in the German situation, CAB "persuaded by advice given by the State Department was more liberal in route concessions to Germany than it otherwise might have been."

Routes to New York, Chicago, the U.S. West Coast and to Latin America for the Germans were termed a "giveaway" by U.S. lines and by Smathers himself. The Senate group expects to recall Rizley and State officials for further elaboration at this month's hearings.

Koch, CAA Director, To Retire Sept. 30

Alfred S. Koch, CAA director of aviation safety, will retire on September 30 and has submitted his resignation as of that date to CAA Administrator Fred B. Lee. He has been with CAA for 25 years, having joined the agency in 1931 as an aeronautical inspector.

Prior to assuming his present post, Koch had served as chief of the general inspection division, director of safety regulation and regional administrator of the International Region. He plans to become an aviation consultant after retiring from CAA.

Airline Gains Create Dilemma for Railroads

- **Subsidy proposal by ICC Chairman Mitchell draws mixed reactions from RR officials.**
- **Rail revenues continue tailspin as airline markets expand.**

By SELIG ALTSCHUL

AS THE AIRLINES have continued to broaden their markets, the railroads have had a tendency to step-up their claims of unfair competition. The main rallying cry has centered around "subsidies"—as if this form of support to the airlines has been responsible for the railroad industry's sharply declining passenger traffic and decreasing general earning power.

Altschul

While the airlines have no doubt caused some diversion of rail traffic, the bulk of business moving by air has been created by economic and technological progress in the air transportation art. By the same token, traffic and revenue losses experienced by the railroads can hardly be laid at the doorstep of "unfair" airline competition.

Now comes R. R. Mitchell, Chairman of the Interstate Commerce Commission, with a suggestion that railroad passenger service be subsidized by the Government. This proposal has drawn mixed reactions from railroad officials.

It is significant however, that the chairman of the ICC viewed this proposition as perfectly natural. He noted "subsidy" is a bad word, but "price support" is very much in favor throughout the Middle West in maintaining agricultural prices. For this reason—Mitchell would call his railroad subsidies "passenger support."

• **What price** this "passenger support" in the form of proposed railroad subsidies? For 1954, the net railway operating deficit from passenger services, as computed by the ICC, amounted to $669.5 million for Class I railroads. This compares with the record deficit of $704.5 million in 1953, and deficits of $642.4 million in 1952, $680.8 million in 1951, and $508.5 million in 1950.

If subsidies were to come to railroads, it is presumed a fair rate of return on the investment may also be sought and added to "passenger support" government payments.

By contrast, the domestic trunk airlines received total subsidies, or "public service" payments, of $18.9 million in fiscal 1951, $6.4 million for fiscal 1952, $3.5 million in fiscal 1953, $3.8 million in fiscal 1954, and $4.9 million estimated for fiscal 1955.

For all certificated airlines combined—domestic trunks, local service and international carriers—subsidy payments from fiscal 1951 through fiscal 1955 are estimated to have been, respectively, $75.3 million, $67.8 million, $71.2 million, $73.1 million and $66.2 million.

• **It is obvious** that overall airline "public service" payments (for international, feeders and trunks combined) would be a mere pittance if compared with the measure of subsidy support that may be found necessary to convert red railroad passenger figures into black.

Government support in the form of air navigation aids and development of airports hardly represents the substantial subsidy to commercial aviation that some critics may maintain. More and more airports, for example, are not only becoming self-sustaining but are showing increasing profits; all this in addition to the economic contributions being made to the communities served.

What is freqently overlooked by railroad critics of the airlines, and so implicit in Mitchell's own suggestion, is that airline subsidies are not subsidies to the recipient airlines but, more realistically, a form of support to fulfill objectives of national policy and a bounty to the users of the service themselves. Certainly, those air carriers, whether they be international, trunk or feeder, who remain dependent upon mail subsidies, have fallen far short of enriching their stockholders.

• **Now as to** competitive trends between the airlines and the railroads, what are the facts? Recent studies by the Interstate Commerce Commission's Bureau of Transport Economics and statistics help achieve proper perspective in this matter.

Table No. I accompanying this article shows the well-known trend of domestic airline trunk traffic establishing new peaks following the postwar adjustments. While this was going on, rail traffic went into a sharp decline. A large measure of the increase in air traffic is attributable to the expansion of coach travel.

In the nine-year postwar period 1946-'54, first-class air passenger-miles have increased from 5.9 billion to 10.9 billion, or by 84.9 per cent, and in the 5-year period, 1950-'54, 62.6 per cent. In the same five-year period, air coach passenger-miles have increased from 1 billion to 5.3 billion, or by 403.9 per cent.

In the five-years, 1946-'50, railway parlor and sleeping car passenger-miles were more than halved, falling from 19.8 billion to 9.3 billion. However, rail

TABLE I—REVENUE PASSENGER-MILES
(Millions)

	First-Class			Coach		
Year	Rail Parlor and Sleeping Car	Air Regular Flights* (Trunk)	Percent Air of Rail and Air Combined	Rail Excluding Commutation	Air (Trunk)	Percent Air of Rail and Air Combined
1946	19,801	5,903	23.0%	39,039	xxx	xxx
1947r	12,261	6,016	32.9	27,660	xxx	xxx
1948r	11,015	5,840	34.6	24,315	xxx	xxx
1949	9,349	6,322	40.3	20,273	249	1.2%
1950	9,338	6,710	41.8	17,443	1,056	5.7
1951	10,226	8,939	46.6	19,524	1,272	6.1
1952	9,504	9,775	50.7	19,758	2,346	10.6
1953r	7,950	10,580	57.4	18,955	3,717	16.4
1954	6,850	10,913	61.4	17,689	5,321	23.1

NOTES: * *As air coach service began in 1948, the figure for that year includes a small number of air coach passenger-miles.*
r *Revised.*
SOURCE: Transport Economics Bureau of Transport Economics and Statistics, Interstate Commerce Commission.


power in four packages
One big advantage of the Napier Eland propeller-turbine is easy maintenance. Eland power comes in four packages — (1) the reduction gear assembly, (2) the compressor assembly, (3) the main support plate and combustion chamber assembly and (4) the turbine unit. Interchangeability of these major components is catered for, thereby ensuring simple and cheap maintenance.
more facts about the Eland
* High aerodynamic efficiency — 3,000 e.h.p. in a maximum diameter of 36 inches.
* Low specific weight — 0.52 lbs./e.h.p.
* Low specific fuel consumption — 0.450 lbs./e.h.p./hr. at 36,000 ft. 400 knots cruising: 0.505 lbs./e.h.p./hr. at 20,000 ft. 350 knots cruising.
* Ease of control — single lever control with manual over-ride, guards against engine overspeeding and overfuelling.
* Automatic temperature compensation.
* At the first attempt the Eland has recently passed a 150 hour type test rehearsal at the full 3,000 e.h.p. rating.
NAPIER Eland turbo-prop
Partners in Progress with The ENGLISH ELECTRIC Company Ltd.
D. NAPIER AND SON LIMITED · LONDON. W.3.

HELICOPTER LEADS DISASTER DRILL—The U. S. Coast Guard and the American Red Cross combine forces to practice highly effective rescue techniques in a simulated disaster. The drill took place off Brooklyn, New York. Having led two surfboats to the beach, a Coast Guard Sikorsky HO4S hovers nearby to effect any further rescues necessary. Versatile Sikorsky helicopters see extensive service in Coast Guard units.

AROUND THE WORLD WITH SIKORSKY HELICOPTERS

CONGO COPTER—Sabena Belgian World Airlines officials prepare to test one of three Sikorsky S-55 helicopters soon to fly over Belgian Congo jungles. The helicopters will spray and dust insecticides in the never ending battle against disease-bearing insects. Sabena will operate these S-55s along with the S-51s which pioneered this jungle work in the Leopoldville area.

HELICOPTERS RESCUE 93—Two H-19 Sikorskys from the U. S. Air Force's Air Rescue Service last March rescued 93 men, women and children from a storm-swept South Carolina lake. They were stranded on sandbars and small islands when violent storms struck suddenly. The helicopters made more than 23 trips to bring the marooned people to safety on the mainland.

ARMY GETS FIRST H-34s—Two big H-34s, Army versions of Sikorsky's new S-58 helicopter, take off on their delivery flight. First deliveries of this model began in March. The H-34 provides a substantial increase in size, capacity and performance over the Sikorsky H-19s already in wide use by Army units. The big H-34 has as its Navy counterpart the anti-submarine HSS.

HELICOPTER HISTORY:

First helicopters sent overseas by the Army

In November, 1943, the first helicopters to be sent overseas, Sikorsky R-4s, were delivered at Stratford, Connecticut to the Army Air Force. They were disassembled and loaded into cargo planes for the long flight to the China-Burma-India war theatre.

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TABLE II—AVERAGE REVENUE PER PASSENGER-MILE

Year	Class I Railways: Parlor Car and Sleeping Car [1]	Class I Railways: Coach*	Intercity Class I Motor Carriers	Scheduled Domestic Airlines
	Cents Per Passenger-Mile			
1942	2.40	1.77	1.65	5.28
1947	2.74	2.02	1.70	5.06
1951	3.27	2.47	1.94	5.60
1952	3.35	2.53	2.02	5.55
1953	3.38	2.53	2.05	5.45
1954	3.35	2.50	2.07p	5.39p
	Percentages of 1942			
1942	100.0	100.0	100.0	100.0
1947	114.2	114.1	103.0	95.8
1951	136.3	139.5	117.6	106.1
1952	139.6	142.9	122.4	105.1
1953	140.8	142.9	124.2r	103.2
1954	139.6	141.2	125.5p	102.1p

NOTES: *p Preliminary.*
r Revised.
* *Coach revenue other than commutation.*
[1] *Revenue figures cover rail passage tickets only, excluding space charges for parlor and sleeping cars.*

SOURCE: Same as in Table I.

TABLE III—PASSENGER-MILES PER VEHICLE-MILE

Year	Class I Railways—Average Revenue Passenger Loads: Coach	Sleeping or Parlor Cars	All Passenger Carrying Cars	Average Bus Load [1]	Scheduled Domestic Air-Average Passenger Loads: Revenue Passengers Per Plane	Percent Seats Occupied By Revenue Passengers
1939	17.0	9.3	13.4	16.4	7.9	56.2
1942	28.8	16.5	23.1	21.3	12.2	72.2
1946	32.0	16.0	24.5	21.7	18.2	78.7
1947	27.1	13.0	21.0	20.1	18.5	65.1
1951	23.8	11.6	18.1	18.9	26.0	67.9
1952	23.8	11.3	18.2	18.8	28.0	65.6
1953	23.7	10.1	17.7	18.3	29.2	63.5
1954p	23.2	9.7	17.5	18.1	30.5	62.5

NOTES: *p Preliminary.*
[1] *Intercity Class I motor carriers of passengers.*

SOURCE: Same as in Table I.

passenger traffic in 1946 was abnormally heavy because of military travel following the close of World War II. The figure for 1952, while lower than that for 1951, was still above the 1949 level, but in 1954 first-class rail passenger-miles were lower even than the marked postwar low of 1953. Corresponding first-class air passenger-miles have increased uninterruptedly throughout the period except in 1948.

Rail Coach Declines

• **Similarly, rail coach** passenger-miles were more than halved between 1946 and 1950, declining from 39.0 billion in the earlier, to 17.4 billion in the latter.

In 1951 and 1952, despite the increase in air coach traffic, rail coach passenger-miles staged a rather vigorous recovery to above 19.5 billion. Another decline appeared in 1953 and has continued in 1954 but not to the 1950 level. Air coach passenger-miles increased without interruption in the period 1949-'54.

These trends have resulted in air travel overtaking rail in 1950 and maintaining that lead ever since. Rapid strides are also being made by air coach traffic as compared with rail coach. More realistically, however, air travel may be said to have risen uninterruptedly from 23% of the combined air and railway first-class passenger total in 1946 to 64.3% in 1953, and 70.3% in 1954.

It is small wonder that the New York Central, in an unpublicized move late last year, discontinued the Saturday operation of the Twentieth Century Limited.

Airlines Have Appeal

• **There was nothing unfair** in the airlines accomplishment. Airline travel has simply proven far more attractive in terms of speed, comfort and price.

As shown in Table No. II, the average airline fare has remained rather stable from 1942 through the present. While this has been going on, first-class rail fares have increased almost 40% from 1942 through 1954 and rail coach gained 41.2%. Motor carriers who have the lowest fare structure of all, increased their passenger tariffs by 26% during this period.

Of course, the average air fares are composed of regular, coach, extra and promotional fares. The fact, nevertheless, remains that airline fares afford the best value among all transportation media on an actual and relative basis. The stable air fare structure gives no allowance to the inflationary price level of recent years.

• **Air coach** and other promotional fares have unquestionably stimulated considerable new business, but it is equally true that the low unit revenues and rising operating costs have been exerting a squeeze on profit margins. This condition can become serious to the airlines if traffic should decline or even fail to gain.

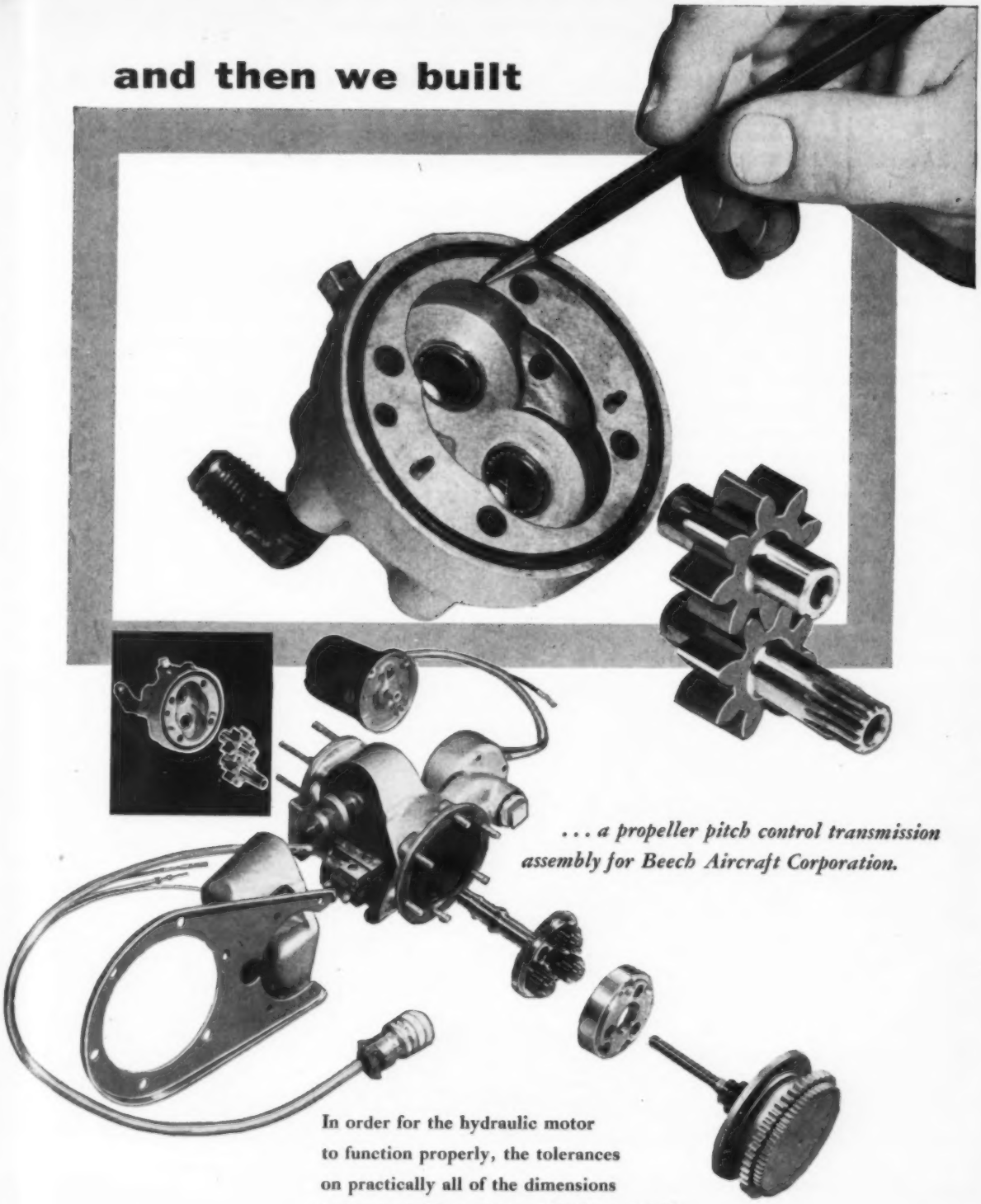
Another significant comparative transportation measure is the passenger-mile per vehicle-mile. This is shown in Table No. III. The average load by air in 1954 was the greatest in the period covered. This heavy loading of planes reflects not only larger planes but also the increased proportion of the passenger-miles of the relatively more fully loaded air coaches.

The rail level for combined coach and sleeping or parlor cars in 1954 was below the three previous years. For the first time in the postwar period, the average load in sleeping or parlor cars fell below ten. The change in bus loads was minor.

It is noteworthy that the average passenger-mile per vehicle since 1951 has exceeded that per first-class rail, coach rail and bus. This was a condition hardly discernible in the comparative figures of 1939 or 1942.

All of these comparative studies reveal no restraint placed on the railroads by the airlines but rather the public's quick acceptance of real values in air travel as reflected by economic and technological progress. • • •

and then we built



. . . a propeller pitch control transmission assembly for Beech Aircraft Corporation.

In order for the hydraulic motor to function properly, the tolerances on practically all of the dimensions had to be held to within .0001″ or .0002″ for squareness, parallelism and concentricity.

INDIANA GEAR

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Reliability Study Shows Need for Systems Planning

• Techniques for predicting equipment performance being developed by Defense Department research projects.

By HENRY P. STEIER

The problem of electronic equipment reliability has increased steadily with the rapid advances in the use of electronics. Human operators are being replaced by new equipments, and fail-safe use of electronics becomes more and more imperative for combat effectiveness in time of war.

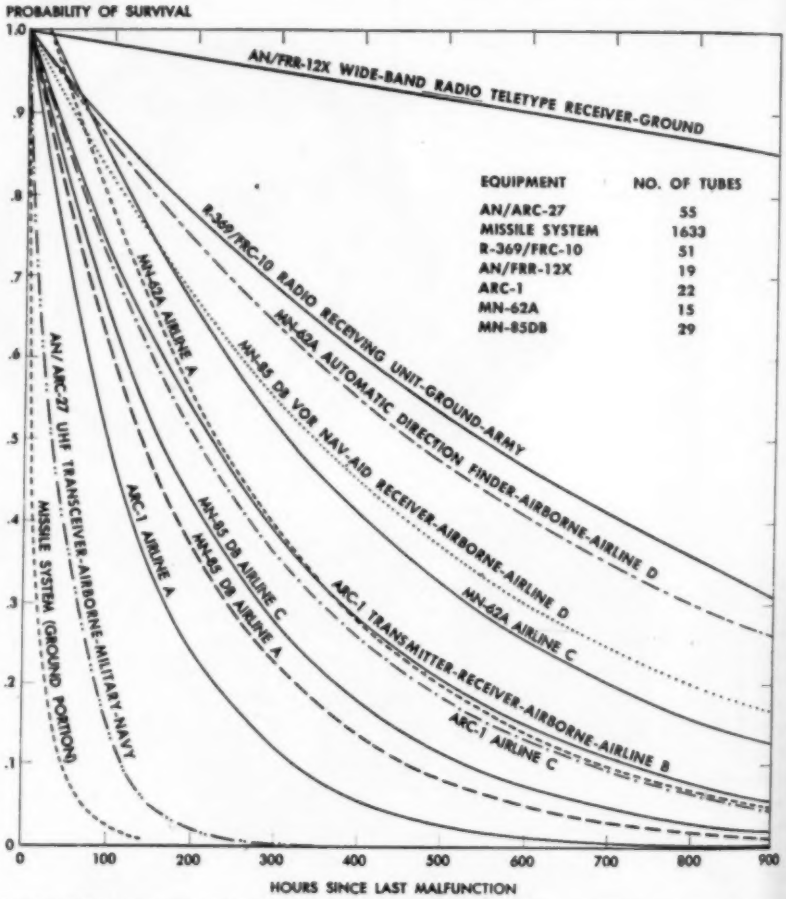
Although still in embryo, techniques for predicting equipment reliability are expected to emerge from research being sponsored by the Department of Defense to expand the frontiers of knowledge about the exact nature of the problem.

•**The history** of the search for reliability is rife with varied standards of quality adopted by individual manufacturers, invalid tests based upon incomplete concepts, and in general failure to apply the scientific method to approach the problem. Needed most was the scientific attack that permits engineers to measure what they are talking about. Ultimately this means the ability to predict reliability, so that real progress in engineered reliability can be made.

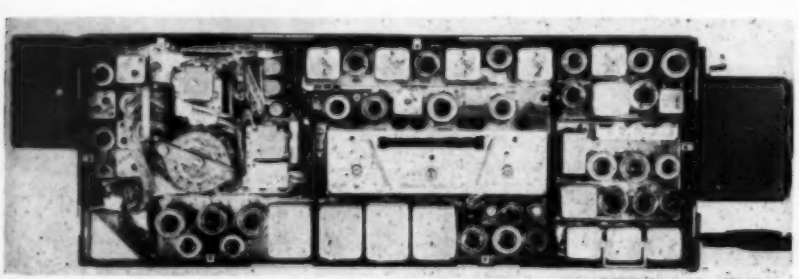
Some indication of the importance with which the three military departments regard the reliability prediction task was given by Dr. D. A. Quarles, Assistant Secretary of Defense for Research and Development, when he said, ". . . some two or three hundred research and development projects (are) specifically directed to this end. A new branch of technology is springing up, which might be called reliability engineering, that makes it possible to assign quantitative values to what has previously been a somewhat vague quality.

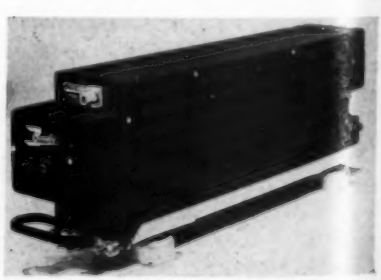
"The guided missiles people, both in industry and government, are becoming reliability conscious to the point of insisting on subjecting missile designs to reliability engineering scrutiny. If this is done realistically it may delay the new era of pushbutton warfare, but if and when the era does arrive we will be a lot surer it has come to stay. Competing equipments are coming to be evaluated not only in the number of tricks they will perform, but also in the reliability of service they can be expected to render."

To this he added, in what may prove to be a sound prediction of weap-



THEORETICAL RELIABILITY FUNCTIONS that show the startling variability of seven types of equipment.





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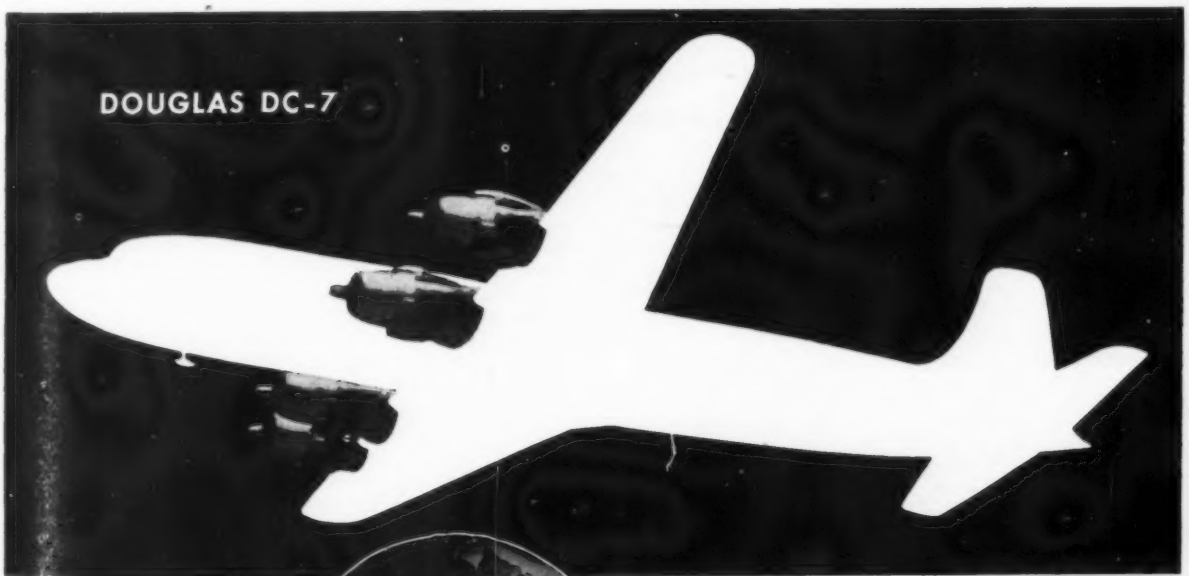

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*A trade name of Curtiss-Wright

ons system concept value, "The Department of Defense has recognized the futility of trying to procure integrity and reliability, particularly in the development phase, through government competitive purchase practices and is actively seeking a better solution of the problem."

• **Basic definition** of the problem and work directed to finding the formulas that will give direction to the industry was assigned by Defense to various groups. The airlines, as early as Germany, and six guided missile plants. 1946, recognized the problem and through Aeronautical Radio, Inc. initiated a program directed to providing more reliable electron tubes for airline equipments. Accordingly, ARINC was selected by Defense to undertake the investigation of electronic equipment reliability as affected by electron tube performance.

Working since 1951 on this one part of Defense's large-scale reliability program, the Military Contract Department of ARINC has been processing data on electron tubes from eight field stations in the U.S.A. and southern The number of tube sockets under their surveillance last year was 500,000. Failed tubes with data reached them at a rate of 4000 per month.

ARINC's MCD Director, Ray Knight, is a devoted champion of the classical scientific approach to the production of valid results in the reliability studies. He believes that to accomplish the difficult and complex task of supplying corrective measures to improve tube and equipment reliability, the individual steps must be:

- Complete, concise definition of the problem.
- Investigation—facts and data.
- Generalization—tentative conclusions or hypotheses.
- Verification—supporting or refuting the generalizations.
- Then finally, the experiment must be repeated under varied conditions, or the problem re-evaluated—depending upon whether the generalizations were correct.

ARINC's definition of reliability is: "The reliability of an electronic product is the probability that the product will give satisfactory performance for a given period of time when used in the manner and for the purpose intended." This definition was reduced to a mathematical expression, and is applied to ARINC's statistical studies of reliability.

Investigations by ARINC and other organizations thus far show that equipments and components fail prematurely because they lack strength to withstand the stresses imposed on them. These are ascribed to four basic factors.

• **Operating problems** are related to lack of skill in operating equipment through the knobs and other controls. This is a barrier to proper use and long life. It can be aided by simplified or automatic operations.

Maintenance, or the simple opening of "black box" for servicing, has various effects, and an important economic result. For example Stanford Research Institute estimates the cost of maintaining standard equipment for its entire life to be 10 to 100 times the initial cost.

ARINC believes there is no valid objection to a system which precludes replacement of tubes as field maintenance practice, and instead complete "black box" sub-unit replacement is the simplest and most effective approach to eliminating the military field technician skill factor; often the cause of equipment malfunctioning through attempts to correct operations by replacing tubes.

Environment, long generally held as the basic source of stress, was analyzed with respect to temperature, vibration, shock, altitude, and power source regulation.

Increased complexity and limitations in space are becoming serious reliability problems because of increased heat dissipation requirements. Now, tubes are rated on the basis of surface temperature effects. The transistor does not solve the problem, since the maximum surface temperature it can stand is low. Surface temperature endurance capability of the electron tube may be the only barrier to long life tubes. Altitude too, poses a major problem because of the small amount of heat transferred to heat sinks at low air pressures.

• **The trend to subminiature** tubes has improved the mechanical stress capabilities of tubes imposed by vibration and shock. Progress in this area has been good so that reliable components can be made for shock and vibration conditions in most vehicles—guided missiles excepted.

Performance characteristics of power sources often force the equipment designer to meet specification requirements incompatible with reliable component operation, particularly for electron tubes.

ARINC believes the major responsibility for reliability in the case of a non-standard application, i.e., operation outside of published ratings, rests with the circuit designer.

• **Emphasis during** the first two years of ARINC's MCD work was on collection of basic information, and the definition of technical problems associated with tube reliability. Since, according to Knight, everyone talks about reliability in different terms, the next step was to define the terms of interest to provide a standard terminology that would facilitate communication between groups working on different aspects of the problem.

In 1955, emphasis changed from studies of individual military bases to cross-base generalizations, and to completion of the task of evaluating the degree of improvement in "improved" tube types such as RCA's "Special Red Tubes," Sylvania and Raytheon subminiature tubes for high bulb temperature operation, Air Force CT tubes, GE's "Five-Star" tubes, and others.

The shift to an attack on the development of techniques for calculating equipment reliability while the design is still on the drawing board, or in preproduction, is well under way. ARINC has made progress in particular phases of the problem. It has presented a limited view of the reliability of present-day equipments. There are also serious problems in estimating equipment reliability from knowledge of components (assemblies of parts) and in appraising results.

• **Seven types of equipment** operating on military bases—air and ground, and on three airlines—airborne, were evaluated. The military equipment included a communications set, teletype receivers, and the ground-based portion of a ground-to-air missile guidance system. Airlines equipment included communications transmitter-receiver, an automatic direction finder receiver and a VOR navigational receiver common to military and airlines use.

The measure of reliability was time-between-equipment malfunctions. The results showed marked variation in reliability between equipments of the same type used by different airlines, and among different equipment types. To ARINC, the differences indicate the importance of factors other than equipment design and component quality, and the necessity for considering the types of precautionary maintenance and periodic overhaul to achieve correct evaluation of reliability data.

Also, it was shown that complex equipments are subject to malfunctions because of the inability of maintenance personnel to identify true causes, and when a malfunction occurs the decision to replace components is generally determined not by whether the component will correct the malfunction, but by whether the maintenance personnel are satisfied with the particular component. In more than 50 per cent of the cases considered, the decision to work on the equipment was subjective and not based on a clearcut need.

• **One surprising result** was the appearance of information that complexity and reliability are not inversely proportional. Sometimes increasing the complexity of a specific portion of a circuit means less stress on a particular component.

ARINC says the outlook for improved reliability of commercial equipments and tubes is bright. But, judging by the comparisons between military and commercial equipment reliability the outlook in the military field would be dim but for systems planning programs inaugurated by the military services.

The basic concept now emerging is the necessity to include consideration of the entire system in terms of environment, operation and maintenance if high reliability of individual components is to be achieved. This includes the equipment, the vehicle, the operators and the maintenance crews in charge of upkeep. There is reason to believe the weapons system concept contributes to this need. At least from present information, ARINC's next major objective, a technique for calculating reliability while the equipment is on the drawing board can only be utilized through very good design coordination. • • •

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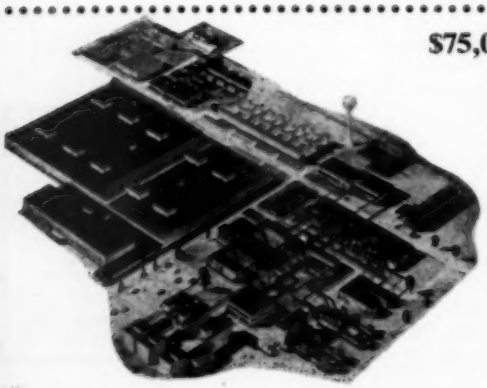

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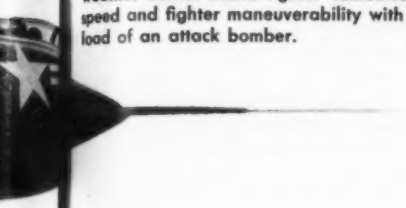

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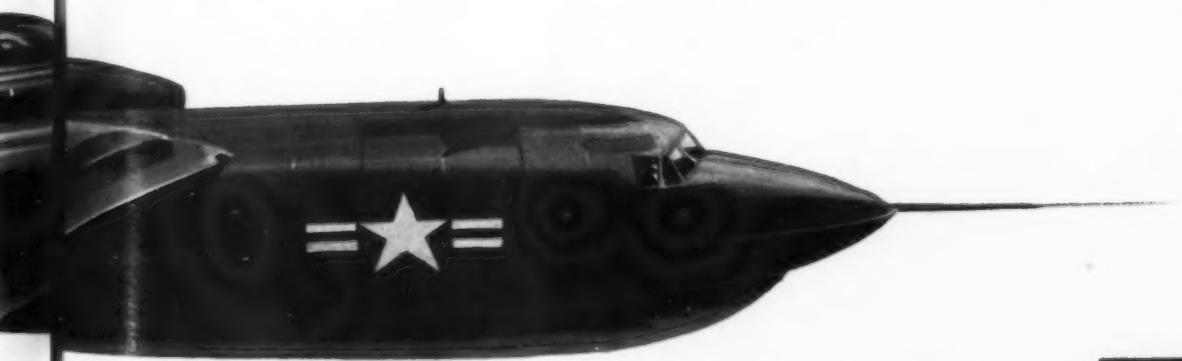


Martin XP6M SeaMaster

World's first multi-jet attack seaplane, the Navy's Martin XP6M SeaMaster, is powered by four Allison J71's with afterburners. It is in the over 600 MPH class and is designed to cruise normally at 40,000 feet.

GM
GENERAL MOTORS
AIRCRAFT POWER

ALLISON TURBO-JET AND TURBO-PROP ENGINES

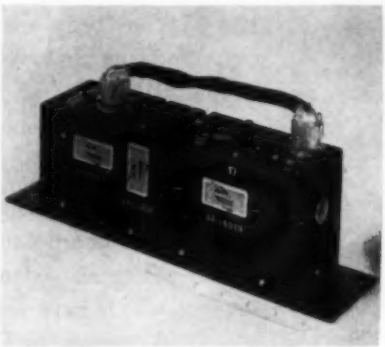
...more than six million hours of flight time—*experience where it counts most—in the air!*

New Products and Processes

STRAIN GAUGE SYSTEM

The Greenleaf Mfg. Co. has developed an airborne self-balancing strain gauge system with a direct-reading remote indicator, designed to register very minute deflections due to stress or strain in aircraft structural parts on a continuous monitoring basis.

The system consists of a potentiometer, servomotor, gear train, indicator, comparator, amplifier and a transmitting synchro. The equipment, designed to meet military specifications, weighs less than 10 lbs. and occupies less than 125 cu. in. of space.



The Greenleaf system is designed for use of two comparators of different types. One adaptation is the position of a potentiometer as a percentage of full potentiometer range. The system also registers the output of a 350-ohm strain gauge bridge as a percentage of full-scale force input.

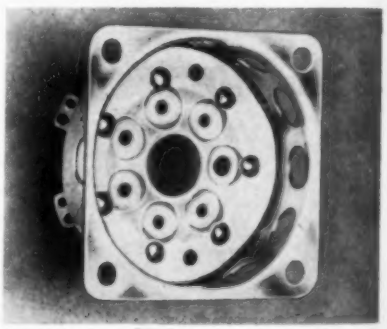
According to the manufacturer, use of this system will improve safety and reduce maintenance time, as well as provide vital information about stress or strain prior to structural failure.

Circle No. 150 on Reader Service Card.

VHF TUBE SOCKET

A compact 7-pin steatite tube socket for septar-based tubes, such as RCA type 5894 and Amperex 6252, is available from E. F. Johnson Co.

The socket requires 1/3 inch less chassis space than previous types and has an integral ventilated aluminum



shield base that submounts the tube for optimum shielding. The manufacturer says the new design will permit more compact equipment design for aircraft and other types of mobile equipment.

Circle No. 151 on Reader Service Card.

ANGLE OF ATTACK TRANSDUCER

An airstream-type vane transducer said to be able to "filter out" non-significant, localized high-frequency airstream fluctuations has been developed by G. M. Giannini & Co., Inc.

Designated Model 25116, the instrument provides constant dynamic characteristics under military aircraft

flight conditions. Natural frequency, damping and response are completely

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have ordered

VICKERS VISCOUNTS

powered by

ROLLS-ROYCE DART

propeller turbine engines

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ROLLS-ROYCE LIMITED · DERBY · ENGLAND

independent of altitude and airspeed, according to the manufacturer.

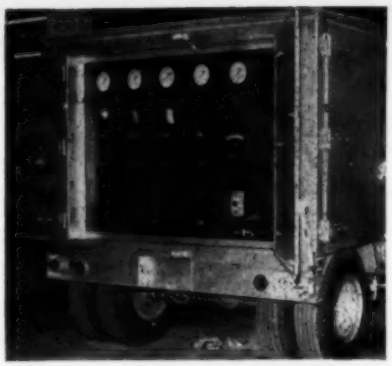
The transducer is available with potentiometer, synchro or both types of outputs, in ranges up to 60 degrees.

Circle No. 152 on Reader Service Card.

PRESSURE BOOSTER

A compression transfer machine for boosting pressures and increasing delivery rates of air or inert gases delivered by standard compressors has been developed by Greer Hydraulics, Inc.

Mounted on wheels, the machine contains hydraulic and electrical circuits for local and remote control of



6,000 psi, 10-gallon accumulators that function as pressure transfer barriers. The unit is self-contained except for two remote control panels.

The 20 gpm, 6,000 psi variable displacement piston pump is servo-controlled. Rate of delivery is varied by adjusting a modutrol motor and linkage operated by rheostats on the local and master panels. Basic principle of the system is the use of high pressure oil through a transfer barrier to compress a large volume of gas.

Circle No. 153 on Reader Service Card.

PLASTIC CABLE CLAMP

Shakeproof Division, Illinois Tool Works, has developed a one-piece nylon clamp for holding wires, cable and tubes. It may be used instead of aluminum clips, which must be insulated.

The Shakeproof clamp is said to be lighter than aluminum and capable of withstanding a wide range of temperatures. Its curved-base design and snap-in feature tend to eliminate or minimize rattles.

Circle No. 154 on Reader Service Card.

WIDE-BAND SHAKER

A new vibration machine for the frequency range of 5 to 5000 cps is made by The Calidyne Co. The Series 8000 Wide-Band Shaker System operates with single frequency, sweep cycling, or a complex waveform input signal.

The input signal may be compared with the Shaker table acceleration signal by means of a dual-beam oscillo-

AIRCRAFT INSTRUMENT LIGHTING GOES MODERN WITH Bendix INTEGRAL LIGHTING

Following extensive experimentation since 1951, we are now making *Integral Lighting* available on our panel-mounted aircraft instruments . . . including both bezel and clamp-on mounting styles. This new lighting system, which is accomplished with only minor changes in standard instrument design, meets the latest military specs for instrument illumination. Here are some of its features:

DARK ADAPTATION: By day, numerals and graduations show white on a black background. By night, they are lighted in *Identification Red* – the color science has *proved* best suited for sharp readability with minimum effect on "dark-adapted" eyes.

UNIFORM, ADJUSTABLE BRIGHTNESS: Bendix Integral Lighting is even and shadowless . . . has a uniformity of .5 to 1.5-foot lamberts. Intensity is adjustable for maintaining readability through dusk to dawn flying.

NO "JUMPINESS": Through skillful design and scientific application of a new conductive type of direct and back lighting, random light is minimized and held at just the right level to maintain instrument definition and avoid "jumpiness" of graduations and numerals.

Bendix Integral Lighting has to be seen in person to be *fully* appreciated. For a demonstration of its advantages, write ECLIPSE-PIONEER DIVISION, BENDIX AVIATION CORPORATION, TETERBORO, NEW JERSEY.

West Coast Office: 117 E. Providencia Ave., Burbank, Calif.
Export Sales and Service: Bendix International Division, 205 E. 42nd St., New York 17, N. Y.

Eclipse-Pioneer DIVISION

Bendix AVIATION CORPORATION

Circle No. 20 on Reader Service Card.

scope in the control console.

The manufacturer guarantees a response of ± 1 db at 7 to 2000 cps, and ± 3½ db from 5 to 5000 cps, with a bare table. The full 600 lb. force of the system can be maintained over the entire frequency range, according to the manufacturer.

Circle No. 155 on Reader Service Card.

EIGHT-DAY CLOCK

An eight-day clock with luminescent hands and figures and a sweep second hand is available from the Wakmann Watch Co. According to the seller, it is being used as standard

equipment on many of the planes made by Piper, Beech and Cessna. The clock is available with a 12-hour or 24-hour dial and long or short knob. It is wound and set from the front. The case is made of oxidized aluminum.

Circle No. 156 on Reader Service Card.

COURSE DIRECTOR

Aircraft Radio Corp. has announced a new course director system designed to provide correct headings for precise instrument approaches and to give accurate enroute track on omni and visual-aural VHF ranges.

The "compass-slaved" gyro is said to furnish precise, stabilized directional information to the heading computer. Track information is obtained from a conventional omni/localizer receiver,

COMING RIGHT UP

FOR BUSINESS AIRCRAFT

The right heater—the right accessories—the right system for *your* business aircraft.

Pick it from Janitrol's complete line, the heater line that is organized . . . thought out . . . engineered to create combinations of heating units, components, and accessories for dependable systems in all types of business aircraft—from the smallest to the largest. Performance proved since 1942. Duplicates of these heaters, or their counterparts, have totalled millions of operational hours in civil, commercial, and military aircraft of all sizes all over the world.

Output of from 25,000 to 200,000 Btu/hr in single units—to more than a million Btu/hr in multiple units.

Compact, simple, interchangeable, easy to install—check with your local modification center or your nearest Janitrol office.

Backed by 50 years of experience in combustion engineering

New 58-page catalog—for business aircraft owners and modification centers—showing all Janitrol models, accessories, components—installation tips, and engineering data.

Janitrol

AIRCRAFT-AUTOMOTIVE DIVISION
SURFACE COMBUSTION CORPORATION
Columbus 16, Ohio

District Engineering Offices: New York, 225 Broadway; Washington, D. C., 4650 East-West Highway; Philadelphia, Penna., 401 No. Broad St.; Kansas City, Mo., 2201 Grand Ave.; Fort Worth, 2509 Berry St.; Hollywood, Calif., 7046 Hollywood Blvd.; Columbus, Ohio, 400 Dublin Ave.

Circle No. 21 on Reader Service Card.

such as the ARC Type 150, to intercept and maintain the desired track.

According to the manufacturer, the vertical needle, which responds to the compass-controlled azimuth gyro, provides a means of maintaining a precise heading, even in severe turbulence.

Circle No. 157 on Reader Service Card.

SWIVEL CHAIR

A chair designed to meet the demand for an office-type unit for business planes is offered by Hardman Tool & Engineering Co. Designated

Model 633, it is equipped with a full 360-degree swivel mechanism with position lock. Provisions for bolt-down, quick release or track-type floor attachment can be incorporated, at the option of the buyer.

Circle No. 158 on Reader Service Card.

MOBILE AIR CONDITIONER

An air conditioning unit capable of delivering air as cool as 20° F, designed for use with guided missiles, is being produced by C. G. Hokanson Co.

Cool air is carried from the unit to the delivery point by Spiratube, a flexible, fabric-covered ducting manufactured by the Flexible Tubing Corp. The ducting is said to provide high resistance to heat conduction or absorption.

The unit maintains air temperature

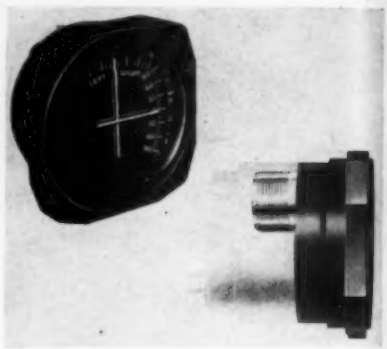

NUCLEAR PROPULSION?
ADVANCED DESIGN?
WHAT INTERESTS YOU?
Lockheed's Georgia Division long-range expansion program requires Engineers in all categories. Qualified Engineers interested in the complex and intriguing developments ahead in this progressive Engineering Organization are invited to inquire, in strictest confidence, for more information.
R.S.V.P.
JIM WADE
ENGINEERING PROFESSIONAL PLACEMENT
LOCKHEED
AIRCRAFT CORPORATION DEPT. AMA-815
761 PEACHTREE N. E., ATLANTA, GEORGIA

at a constant level, with a tolerance of ± ½ deg.

Circle No. 159 on Reader Service Card.

MULTI-PURPOSE INSTRUMENT

A new series of small, lightweight instruments, for such applications as ammeters, voltmeters, temperature indicators and radio navigational instruments, has been developed by the Mar-



ion Electrical Instrument Co.

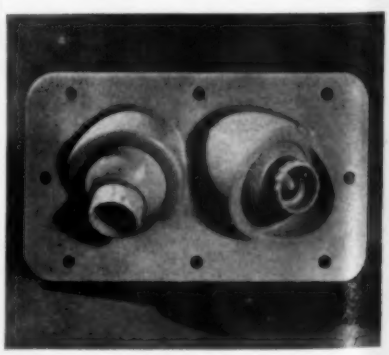
Designated AN3C-2E by the manufacturer, the instrument meets the requirements of Army-Navy aeronautical design standard AND 10401 (superseded by Military Standard MS 33550) for 2¾-in. dial instruments. It is available with one, three or four elements.

Circle No. 160 on Reader Service Card.

ADJUSTABLE AIR VALVES

Plaskon melamine, a product of Barrett Division, Allied Chemical & Dye Corp., is being used in the manufacture of adjustable air valves by the Wemac Co.

Such valves as the one currently



used on the Douglas DC-7 weigh only 1.8 ounces. They have low thermal conductivity, are warm to the touch and greatly reduce the possibility of undesirable water condensation.

Melamine plastic also is used in the manufacture of reading lights and other fixtures in commercial and military aircraft.

Circle No. 161 on Reader Service Card.

TINY GYROSCOPE

Gyroscopics, Inc. has developed what it believes to be the smallest rate gyroscope available, weighing only 1¼ oz. and measuring one cubic inch. It is said to have excellent shock and vibration resistance.

The tiny gyro uses three watts of 400-cycle power. It is hermetically sealed and has a damping ratio of 0.7 to 0.4 over the temperature range of minus 55 C to plus 75 C. Because of its high signal-to-noise ratio and low hysteresis, the gyro is capable of measuring very low angular rates.

Circle No. 162 on Reader Service Card.

GANGING POTENTIOMETERS

DeJur-Amsco Corp. offers a new series of enclosed ganging potentiometers for electronic applications. According to the manufacturer, they do not require the extended refinement of

more expensive high precision types.

With a power rating of 8 watts, these potentiometers feature 3606 external phasing, adjustable or fixed taps and linear or non-linear resistance elements.

Circle No. 163 on Reader Service Card.

TACK CLOTH

A new type of tack cloth offered by the George W. Renner Co., tradenamed Tac-All, is said to absorb all dirt and dust particles when used to wipe wood and metal surfaces where high quality finishes are required.

The cloth is impregnated with a

ARMY AND AIR FORCE H-21's TAKE TO THE AIR IN CIVIL DEFENSE EVACUATION

121 Top Ranking Government Officials Rapidly Moved To Safety During OPERATION ALERT—1955

At 12:05 p. m. on June 15th when the sirens sounded in the nation's capital for OPERATION ALERT — 1955, 12 Piasecki H-21 helicopters descended upon the Pentagon area to evacuate top government and military officials.

For the first time helicopters were used for a mass evacuation in Civil Defense operations. Minutes later our country's key personnel were miles from the Pentagon enroute to relocation centers.

Helicopter courier service to the Pentagon helped maintain business as usual during the three day period.

Our hats are off to the men and women of the Federal Civil Defense Administration and other participating government agencies.

We salute the pilots and crews of the U. S. Army's 509th Helicopter Transportation Company and the U. S. Air Force's 516th Troop Carrier Group who, with their H-21's, successfully accomplished this air evacuation.

We at Piasecki are proud that the Army and Air Force selected the Piasecki H-21 "Work Horse" helicopters for this important mission.

VERSATILE PIASECKI HELICOPTERS IN EXTENSIVE MILITARY SERVICE

The H-21, the only transport helicopter in service capable of carrying 20 passengers, is used for transporting combat troops and carrying loads of military equipment and supplies weighing up to two tons in Army and Air Force operations.

Operation Alert — 1955 is another typical example of the versatility of this and other Piasecki helicopters.

The operational advantages inherent in the Piasecki tandem rotor configuration are being demonstrated in the many tasks it performs under all types of conditions throughout the world. A commercial version of the H-21 will soon be available for airline and industrial use.

This new carrier is another result of Piasecki's unceasing efforts to improve helicopter performance — to build helicopters to do more jobs and do them better than ever before.

ENGINEERS NEEDED FOR:
DESIGN • AERODYNAMICS • TESTING • STRESS ANALYSIS • AIRFRAMES

Military Evacuees Board H-21 at Pentagon

H-21 Participating in Operation Alert—Philadelphia

H-21's Departing from Pentagon to Relocation Centers

Piasecki

HELICOPTER CORPORATION
MORTON, PENNSYLVANIA

Circle No. 25 on Reader Service Card.

substance which, according to the manufacturer, resists drying indefinitely and presents no danger of spontaneous combustion. By removing all foreign particles, the cloth paves the way for additional flawless finishes.

Circle No. 163 on Reader Service Card.

SERVO-ACTUATOR MOTOR

The Burton Manufacturing Co. has announced development and production of a servo-actuator motor package, especially designed for use where exceedingly high speed in starting and stopping of the operating shaft without slip is required.

The "package" consists of a Burton

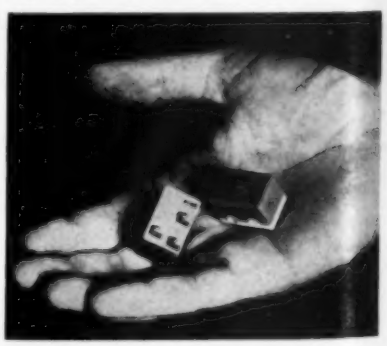
standard series 5,000 1¼-in. diameter permanent magnet-type 115-volt dc motor, a clutch-brake mechanism, a clutch-brake actuating housing and a gear train. The unit measures 1¼ in. in diameter and 3⅜ in. in length.

The motor and clutch-brake mechanism are arranged so that when power is applied, the clutch instantly engages the gear train to the motor unit as the motor accelerates.

Circle No. 164 on Reader Service Card.

KLIXON SINE SWITCHES

Spencer Thermostat Division, Metals & Controls Corp. is making a highly precise, sensitive snap switch for



applications requiring extremely small movement differential with high resistance to shock and vibration.

According to the manufacturer, unusual sine-curved switching element accounts for excellent performance

one of the petroleum industry's biggest headaches

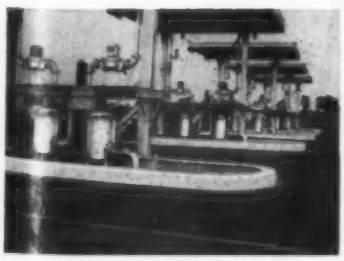
. . . complaint of contaminated aviation fuel even though rigid checks prove fuel to be contaminate-free when it leaves the refinery.

modern filter research has found the answer

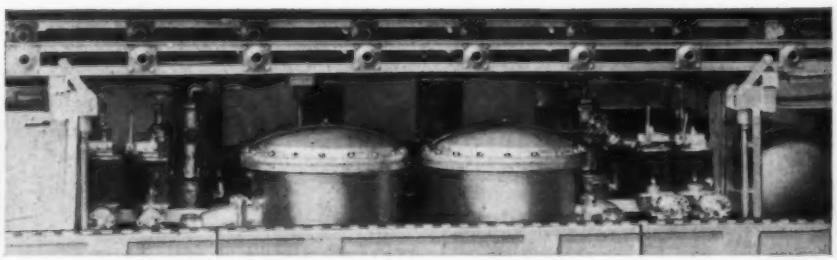
. . . and that answer is bulk filtration with Purolator MICRONIC* filters right at the point of delivery. Purolator's modern research and engineering laboratories have developed the world's finest airport bulk filtration equipment. And, along with it, they have developed valuable ideas for using this equipment to guarantee your customer relations. For details, write Purolator Products, Inc., Rahway, N. J., Dept. B2-82.

*Registered Trade Mark

TYPICAL INSTALLATIONS



AT AIRPORT FUELING RACK
(ten PAG-300 MICRONIC Filters)



IN SIDE COMPARTMENT OF AVIATION FUELING TRAILER
(two PAG-150 MICRONIC Filters)

PUROLATOR

"FIRST IN THE FIELD OF FILTERING"

Circle No. 26 on Reader Service Card.

under shock and vibration. It is said to be able to withstand from 0 to 500 cycles at 10 g's while continuously loaded to within 0.0002 in. of the actuation point.

Circle No. 165 on Reader Service Card.

GAS CHARGING VALVE

A nitrogen charging valve in which cross-sections of critical working areas have been increased is being produced by the Superior Pipe Specialties Co., Hydraulics Division.

Originally designed for the Army, Navy and Air Force, the valve is now available for industrial purposes. Interchangeable with previous A-N valves used to charge hydraulic and pneumatic systems with gas, Superior valves are being employed in landing gear, accumulators and similar applications.

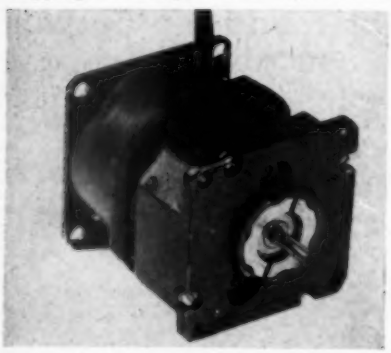
A prime safety factor is the pin built into the locking head, which prevents the stem from dropping into the body of the gas cylinder, company says.

Circle No. 166 on Reader Service Card.

CLUTCH-BRAKE

Air Associates, Inc., Aircraft Products Division offers a new ac electromagnetic clutch-brake that operates without slip rings or rectifier.

Designated the M-6390, the clutch-brake provides mechanical uncoupling of a motor and the driven unit, fast stopping of output shaft (10 milli-



seconds), holding torque and adjustable clutch torque. It is designed for use with 400-cycle ac induction motors.

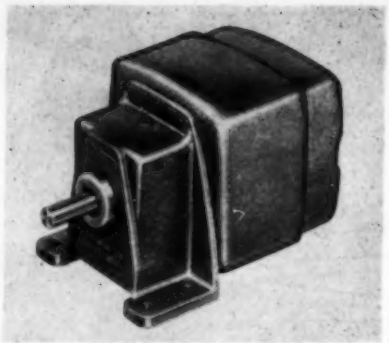
According to the manufacturer, an unusual arrangement of coils, magnetic parts and clutch components enables the M-6390 to overcome the usual difficulties in braking ac power units.

Circle No. 167 on Reader Service Card.

TACHOMETER TAKEOFF HEADS

Metron Instrument Co. is making a new series of tachometer takeoff heads (No. 32) covering speed ranges between 100 and 5,000 rpm.

A double-pole, double-throw switch acts with a capacitor as a speed sensing element when the takeoff shaft rotates in either direction. It transmits a current that is measured on any Metron



indicator nearby or up to 1,000 ft. away.

Takeoff heads having the same speed range may be interchanged without affecting the accuracy of these tachometer indicators, according to the manufacturer.

Circle No. 168 on Reader Service Card.

TANK CONTENTS INDICATOR

The Liquidometer Corp. has announced a new remote reading tank contents indicator especially designed for applications where panel space is limited.

Designated Model 216, the indicator is a dial-type instrument with a scale

length of 20 in. It occupise a panel space of only 3 by 10¼ in. and is available for either horizontal or vertical mounting.

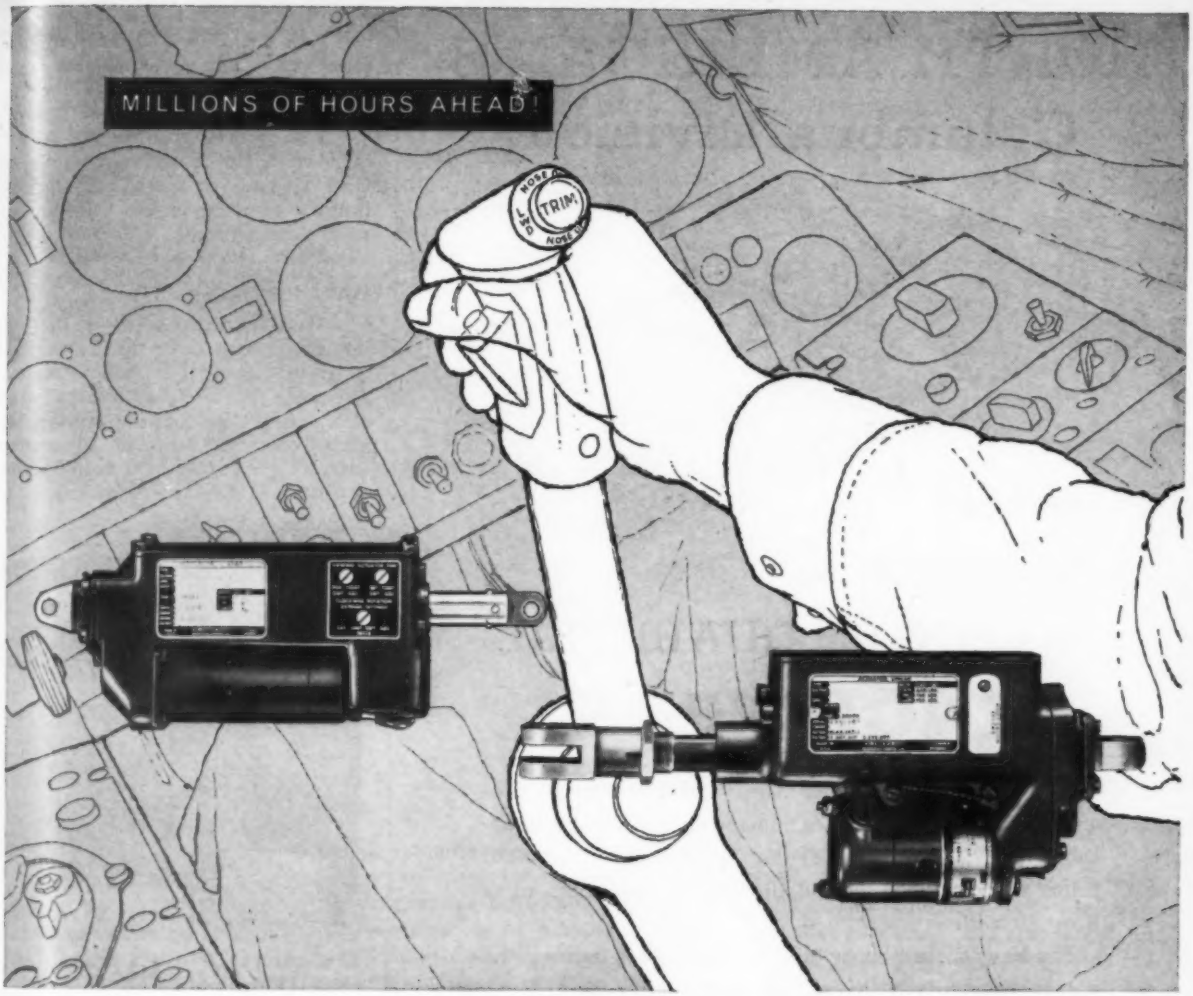
The indicator is used with Liquidometer automatic hydraulic actuated tank contents gauging systems. It may be located as far as 250 ft. from the tank unit.

Circle No. 169 on Reader Service Card.

WIND-O-METER

Aircraft Components, Inc. has announced a weather instrument, the Model AC 3 Wind O-Meter, originally designed for government use, that measures wind direction, temperature from —40 to 120 F and wind speeds up to 100 mph.

Even tornado winds will not damage the instrument, according to the manufacturer. Among its features are an easy-to read sloping front panel, wind speed dial reading in both miles



Now...stick-feel for jets at half 1 lb. 2 lb. the weight!

Aerodynamic pressures generated by the tremendous speed of jet planes made it necessary to power their control surfaces. This left the pilot of the airplane without any "feel" control through his stick.

Actuators were needed to supply this stick "feel"... and they had to be of minimum weight and size.

To meet these requirements AiResearch designed highly-efficient units as light as two pounds. Now an even smaller stick "feel" linear actuator has been developed by AiResearch. It handles operating loads up to 150 pounds... static loads to 500 pounds —*and it weighs only one pound!*

It is the smallest, lightest unit in this field! Again AiResearch shows its ability to top previous performances with a smaller, lighter power package.

In the past decade AiResearch has developed and produced more than 350,000 actuators for every possible aircraft application. Why don't you put the proved ability of this high-quality engineering and manufacturing team to work on your problems? Your inquiries are invited and will receive immediate attention.

Qualified scientists, engineers and craftsmen are needed now. Write for information.

THE GARRETT CORPORATION

AiResearch Manufacturing Divisions

Los Angeles 45, California • Phoenix, Arizona

Designers and manufacturers of aircraft components: REFRIGERATION SYSTEMS • PNEUMATIC VALVES AND CONTROLS • TEMPERATURE CONTROLS CABIN AIR COMPRESSORS • TURBINE MOTORS • GAS TURBINE ENGINES • CABIN PRESSURE CONTROLS • HEAT TRANSFER EQUIPMENT • ELECTRO-MECHANICAL EQUIPMENT • ELECTRONIC COMPUTERS AND CONTROLS

per hour and knots, optional remote indicating electric thermometer and provision for emergency battery operation.

The company believes the Wind-O-Meter should be of special interest to Civil Defense personnel and business firms, as well as to the aviation and marine industries.

Circle No. 170 on Reader Service Card.

DATA RECORDER

Magnetic techniques are used in the Epsco System No. 177, manufactured by Epsco, Inc., Andor Controls Division, to punch automatically on IBM cards data arriving as synchronously from as many as 10 separate sources. The data thus recorded consists of time interval measurements to

an accuracy of .0001 of a sidereal (astronomical) minute.

Dates, identification numbers, shaft positions and temperature are also automatically recorded. The system also provides for measuring the average time interval between pairs of pulses in order to compensate for assymetry in the rate table.

Circle No. 171 on Reader Service Card.

TACK CLOTH

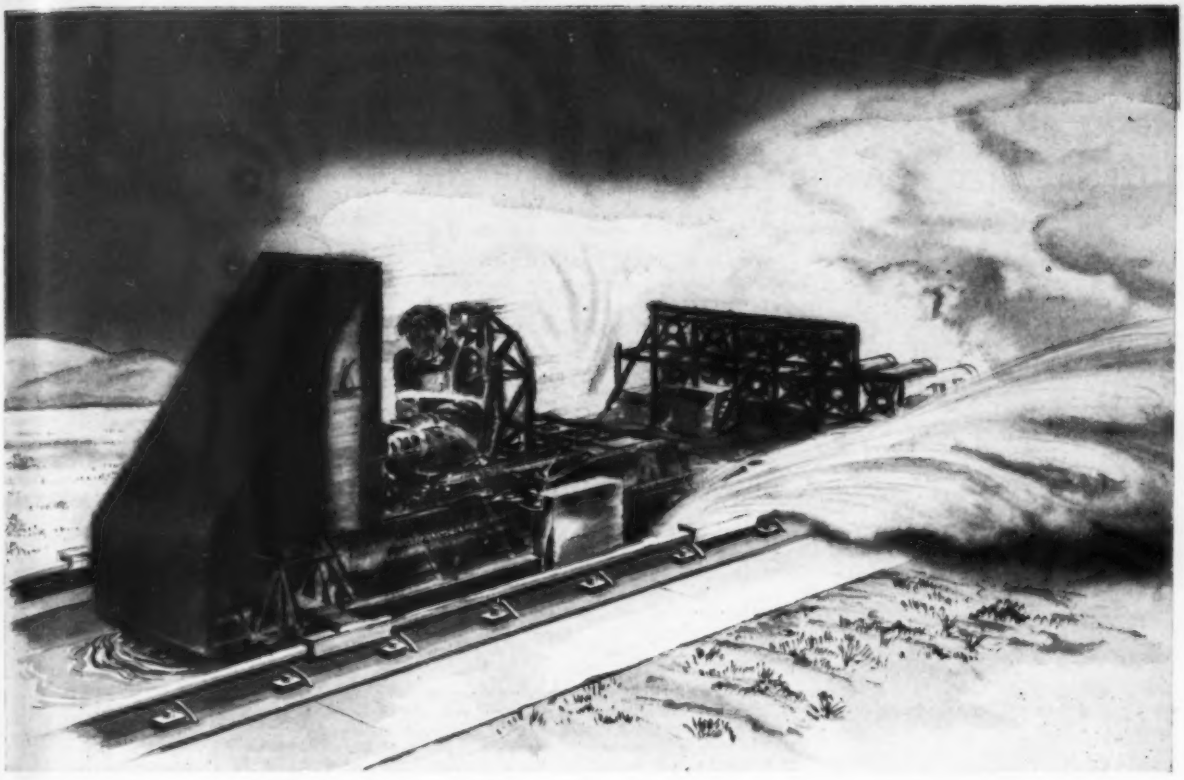
A tack cloth designed for easy removal of lint, dust and abrasive particles in finishing operations is offered by Permacel Tape Corp.

Called Permacel 091, the cloth has been impregnated with a substance which enables it to pick up the unwanted particles and prevent them from spreading or scattering. It is said to be particularly effective in finishing of aircraft, automobiles, trucks, boats and furniture.

Combustion proof, the cloths measure 18 by 36 in. and are packed 12 to a bundle.

Circle No. 172 on Reader Service Card.

For more information about new products described in this section, circle numbers on the Reader Service Card in the front of the magazine.

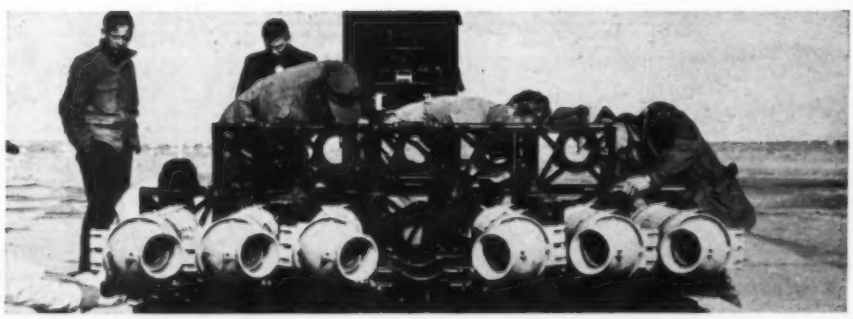


- SOLID- AND LIQUID-PROPELLANT ROCKET POWERPLANTS FOR MISSILE AND AIRCRAFT APPLICATIONS
- AEROBRAKE THRUST REVERSER (SNECMA)
- AUXILIARY POWER UNITS AND GAS GENERATORS
- ELECTRONICS AND GUIDANCE
- ORDNANCE ROCKETS
- EXPLOSIVE ORDNANCE AND WARHEADS
- UNDERWATER PROPULSION DEVICES
- ARCHITECT-ENGINEER SERVICES FOR TEST FACILITIES

AEROJET-GENERAL NEEDS:
Chemical Engineers
Chemists
Electronic Engineers
Mechanical Engineers
Physicists and
Aeronautical Engineers

The high degree of safety and reliability of Aerojet-General solid-propellant rocket powerplants has been demonstrated by their repeated use on manned test sleds. Shown here is the Northrop sled which received widespread attention during deceleration tests conducted at Holloman Air Development Center, with Lt. Col. John P. Stapp, USAF, subjecting himself to deceleration rates up to 35 G's!

Power for the sled comes from six 5KS-4500 Aerojet-General JATOs, providing 4500 pounds thrust each for five seconds. Actually developed and produced for assisted-takeoff of heavy carrier-based aircraft, the use of the 5KS-4500 on the Northrop sled typifies the variety of applications for which the many existing types of Aerojet-General JATOs may be used.



Aerojet-General CORPORATION

A Subsidiary of
The General Tire & Rubber Company

THE GENERAL TIRE

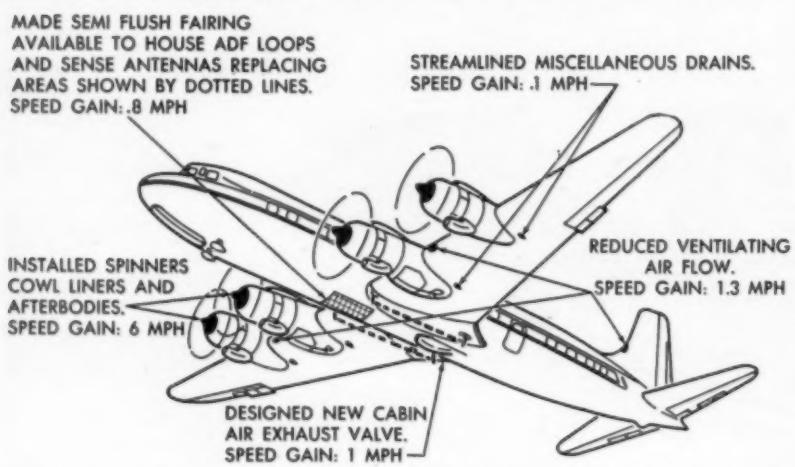
AZUSA, CALIFORNIA
SACRAMENTO, CALIFORNIA

MORE POWER FOR AIR POWER

Circle No. 28 on Reader Service Card.

Maintenance Bulletin Board

Reduced Drag Hikes DC-7 Speed



SPEED INCREASE of nearly 10 mph is represented in these drag reduction items engineered by Douglas into DC-7 series. Biggest gain of 6 mph involves propeller spinners and afterbodies.

Just how important a task airline mechanical crews are faced with in maintaining the aerodynamic cleanness of today's high speed aircraft is no better emphasized than in recent facts released by Douglas Aircraft Co.

On its DC-7, Douglas says, removal of wing flap seals alone would reduce speed one mile an hour with a resulting revenue loss of $7,100 a year.

R. A. Dunlap, Douglas aerodynamicist, names both leakage drag and parasite drag as factors that decrease aerodynamic cleanness on planes in service.

Holes in wings or nacelles and loose access doors are typical examples of leakage drag; skin patches, mismatched skin sections and misrigged flaps and doors are biggest contributors to parasite drag.

Pointing up advances by its designers over the past 20 years, Douglas says its DC-7 would be 55 mph slower if its aerodynamic cleanness level were the same as that of the DC-3. At this rate, the DC-7 would have 640 miles shorter range and would earn $380,000 a year less.

NEWEST IN HANGARS is American Airlines $1-million installation at San Francisco which gives nose-hangar flexibility but still provides doors for protection against the elements. Aperture uses a four-piece, motor-operated device made weather-tight by a plastic-wrapped, heavy sponge rubber gasket. It's called a Bernporture, named after Byrne Doors, Inc., of Ferndale, Mich. and can accommodate two DC-7s.

Mechanics Cautioned On Plastic Tools

Recent edition of one airline's maintenance bulletin carried a warning to mechanics against indiscriminate use of plastic tools.

Airline's caution was the outgrowth of the recent experience of a manufacturer with extremely hazardous plastic-headed mallets. Within a brief period, three mallets caught fire and flashed with sudden intensity. Two of the fires were ignited by small bench torches, the third by a soldering iron.

Subsequent investigation disclosed that the tools were made from a highly flammable nitrocellulose plastic material.

American Airlines Tests New Spark Plugs

American Airlines is now conducting a service evaluation of new spark plugs supplied by Champion Spark Plug Co. and AC Spark Plug Div., General Motors, in Wright Turbo Compound engines.

Test involves three spark plug types — Champion R-103B, R-103BA and AC-285. Two sets of R-103B and AC-285 plugs are installed in four newly overhauled engines. R-103BA plugs are fitted in three engines.

Period of test for the R-103BA plugs is about 500 hours. Other types will be removed after 440 hours and replaced with added sets of new plugs.

Evaluation of the AC-285 plug involves an electrode gap setting of .015 to .018 in. R-103B plugs are identical to standard Champion R-103 type except that the electrode mass has been increased for longer life.

The R-103BA model differs from the R-103B only in the use of a new electrode alloy.

Robinson Designs ADF Mount System

Replacement all-metal mounting system for airline automatic direction finder equipment has been developed by Robinson Aviation, Inc. and is available in kit form.

The new design features an engineered system approach to vibration isolation of airborne electronic equipment, as opposed to current use of individual rubber mountings.

Modification manuals available from Robinson provide detailed rework instructions for installation of the new system with a variety of ADF receivers. Manual No. 100 covers some twelve types of ADF equipment, whereas No. 100-1 applies only to Bendix MN-62A receivers.

People

MANUFACTURING

Dr. Theodore Theodorsen appointed director of scientific research, Republic Aviation Corp.

Blythe

Theodorsen

Harry E. Blythe elected exec. vp of Bellanca Aircraft Corp.

Warren R. Smith made director of advertising for Fairchild Engine and Airplane Corp. **William G. Key** is new director of public relations.

A. M. Gonnella appointed to newly created position of service mgr. for pilotless aircraft div., Boeing Airplane Co.; **Ward E. Parsons** succeeds Gonnella as director of spares for Seattle div.

Grant A. Kettles promoted to director of flight operations, Abrams Aerial Survey Corp.

Arnold Armstrong appointed supt. jet engine component production div., Portland Copper & Tank Works, Inc.

D. E. Fry made asst. mgr. of purchasing and material control for aircraft engines mfg., Allison div. of General Motors Corp.

Paul G. Brown appointed comptroller, Avion—Division of ACF Industries, Inc.

Dan G. Gilmore made factory mgr. for Chance Vought Aircraft, Inc.

Willis H. Guinn appointed controller of Ford Aircraft Engine Div., Ford Motor Co., replacing **J. Franklin Mellema**, promoted to divisional administration mgr.

W. H. Yahn became gen. mgr. of North American Aviation's modification center at Fresno, Calif.

Curtis B. Hoffman appointed vp-sales of Brush Electronics Co.

Dr. Frederic de Hoffmann appointed vp of General Dynamics Corp. also to serve as gen. mgr. of general atomic div.

Mel E. Maurer, former production executive with Lockheed Aircraft and Hotpoint, named president of the Flex-O-Tube div. of Meridan Corp.

Lt. Gen. Laurence C. Craigie (USAF ret.) elected vp of Hydro-Aire, Inc.

J. D. Wethe appointed mgr. of marketing for Evendale operating dept. of General Electric Company's aircraft gas turbine div.

Gen. Craigie

Willis R. Slaughter Brig. Gen. USA, ret.) elected vp of The W. L. Maxson Corp.; **A. J. Colton** appointed mgr. airborne armament dept., and **Frederick D. Vieth**, application engineer.

Walt Cleveland given newly created position of military relations mgr. of Santa Monica div., Douglas Aircraft Co.

D. R. Tashjian appointed mgr. of engineering, electronics div., Westinghouse Electric Corp.

Walter J. Niles elected president, treasurer and director of Kraus Automatic Machines Corp.

AIRLINE

Gwin Hicks appointed president of Lake Central Airlines, Inc.

Tom Keyes named mgr. passenger service, Ozark Air Lines, Inc.

Nelson Lee Smith elected vp-economics of American Airlines; **Tom Holden**, asst. vp-properties and facilities.

H. W. (Bud) Caward appointed system chief pilot for Western Air Lines; **Lester C. Holtan** succeeds Caward as regional chief pilot of Pacific Coast div.

H. M. (Nobby) Clarke named sales planning and tariffs mgr. for North America by British Overseas Airways Corp.

Gen. Ralph P. Cousins (USAF, ret.) reelected president of Los Angeles Board of Airport Commissioners; Don Belding reelected vp.

Frank M. Cassi promoted to cargo sales supervisor, Air Express International Corp.

HONORED

Lawrence D. Bell, president of Bell Aircraft Corp., received the Exceptional Service Award, highest honor the U. S. Air Force accords a civilian, in recognition of his 43 years of aviation "as one of that small band of American pioneers who have conspicuously contributed to the development of air power."

The Navy presented its second highest Meritorious Civilian Service Award to **Marvin Pitkin**, plans manager in office of development planning at Martin, for his outstanding contribution in the development of air-launched guided missiles.

Mrs. Edna Gardner Whyte, Flushing, Mich., elected president of Ninety-Nines, Inc.

Warren Lee Pierson, Trans World Airlines' board chairman, elected president of International Chamber of Commerce.

MILITARY-GOVERNMENT

Mervin F. Bagan appointed assistant to Harmar D. Denny, Civil Aeronautics Board Member.

William E. Neumeyer named exec. secretary of the Air Coordinating Committee.

Dr. J. A. Stratton, provost, Massachusetts Institute of Technology, and **Dr. Mervin J. Kelly**, president, Bell Tel. Laboratories, elected chairman and vice chairman, respectively, of Naval Research Advisory Committee, Office of Naval Research.

Dr. Lowell M. Hollingsworth named director of Electronics Research Directorate, USAF Cambridge Research Center.

Col. Lee W. Fulton made director of procurement for the Air Research and Development Command Headquarters.

Changes at Wright Air Development Center: **Brig. Gen. Thomas L. Bryan** replaces **Maj. Gen. Albert Boyd** as commander; **Col. Homer A. Boushey** becomes vice commander, replacing Bryan; **Col. E. R. Jacoby** succeeds Col. Boushey as chief of staff.

A NEW CONCEPT

IN *comfort*

*Seats by AEROTHERM for the new Capital Airlines VISCOUNT POWERED BY ROLLS-ROYCE

*The seat with the fold-away utility table

Cruising at 25,000 feet, you sit back and enjoy the luxury of a wide, contoured seat that's as comfortable as your old favorite chair. And as the miles fly by, at over 300 an hour, you touch a lever and lean back for a quick nap. There's plenty of leg room to stretch out. You close your eyes and have that lazy sensation of floating on air.

In fact, that's just what you're doing when you ride in the new foam rubber cushioned Zephyr Line seats manufactured by Aerotherm, for Capital's new Viscounts.

There are many other unique features. Exclusive with these seats is the personal table that drops into position for mealtime . . . or for catching up on those letters you should have written. Your ride on the Viscount is practically vibrationless . . . and before you know it, your trip is over and you arrive relaxed and rested in a Zephyr seat.

. . . the *Zephyr* line by AEROTHERM

Project Engineers
THE THERMIX CORPORATION
Greenwich, Conn.
THERMIX CALIFORNIA, INC., 5333 Sepulveda Blvd., Culver City, California
Canadian Affiliates: T. C. CHOWN, LTD., Montreal 25, Quebec

Manufacturers • THE AEROTHERM CORPORATION • *Bantam, Conn.*

new Boeing jet tanker to stretch America's Air Arm with mid-air refueling

Almost daily, continuous flights halfway around the World are being made because huge KC-97 tankers meet bombers for refueling in mid-air. Tankers like the Boeing KC-135 will bring "targets" on faraway Continents within striking distance. The new Boeing KC-135 will haul extra large cargoes because *added strength* with *less weight* is possible with metal honeycomb construction. Kawneer is helping build more planes like the KC-135 *faster* because of excellent metal bonding facilities to produce any kind of honeycomb assembly. Our experience in metal bonding honeycomb will be helpful to you in designing new applications of this material. This is another example of how you can benefit by Kawneer's integrated engineering and manufacturing service.

Kawneer will produce the ailerons for the KC-135 utilizing honeycomb sandwich construction

Illustrated here is the Boeing 707 Tanker-Transport prototype of the new KC-135.

Learn more about Kawneer's Slogan– "Quality products– Economically produced– Delivered on time" *Write for this book*

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AIRCRAFT PRODUCTS DIVISION

Circle No. 31 on Reader Service Card.

West Coast Talk . . . By Fred S. Hunter

BILL MORRISEY's legion of friends will be happy to know that his long-time dream of producing a modern light trainer equally suitable for business and pleasure—at a modest price—is about to come true. It shouldn't be long now before the formalities are completed for a type certificate for the new 1955 all-metal model of his trim, little, two-place, tricycle gear "Nifty."

Hunter

The "Nifty" started out as a spare-time dream. Bill was still an active Douglas test pilot when he organized Morrisey Aviation, Inc. He specialized in big jobs, like the DC-6 and later the C-124, in contrast to his pint-sized pet, which has an empty weight of 900 pounds.

The original prototype, designated the Model 1000C, had a fuselage of fabric-covered steel tubing and a plywood-and-spruce wing, also fabric covered. Morrisey tried it out on his friends. Many of them were factory test pilots and airline captains. The prototype got quite a wringing out. But the reports were uniformly encouraging.

So, a year or so ago, when Bill decided it was time to bring his test flying career to a close and he retired as chief pilot of the Douglas Long Beach division, he went to work redesigning the "Nifty" for conversion to metal. The result is the 1955 Model 2000C. The production plane includes other improvements. A 20-gallon fuel tank carries the range to 350 miles, with reserve, and flaps have been added as a training accessory and for growth. Tandem seating is retained, but later a side-by-side arrangement will be available.

Powered by a Continental C90-12F engine, the new "Nifty" takes off in less than 300 feet, climbs 1,000 fpm at sea level, and cruised at 110 mph. Stalling speed is 40 mph. The plane incorporates stick control, steerable nose wheel, toe brakes, comfortable metal seats and full vision, even from the rear. It has a gentle stall, positive pitch, no roll, no yaw, says Morrisey. It will be in the $5,000/$6,000 price range.

• •

The utility aircraft front is unusually active in these parts at this time. Projects range from Transland Co.'s highly interesting Ag-2 farm and forest airplane, which should be flying this fall, to Hayden Aircraft's Ford trimotor venture. Latter is the Stout Bushmaster. Hayden hopes to have a prototype ready to fly by next April. Baumann Aircraft has one twin-engine, five-place Model B-290 flying and five more in the initial construction stage at Whitman Airpark. Fletcher recently obtained a t.c. on its FU-24, which it has been selling to the top dressers in New Zealand, and is extending its marketing activities on the plane to this country. Streak Aero reports plans to expedite its swift two-placer this fall.

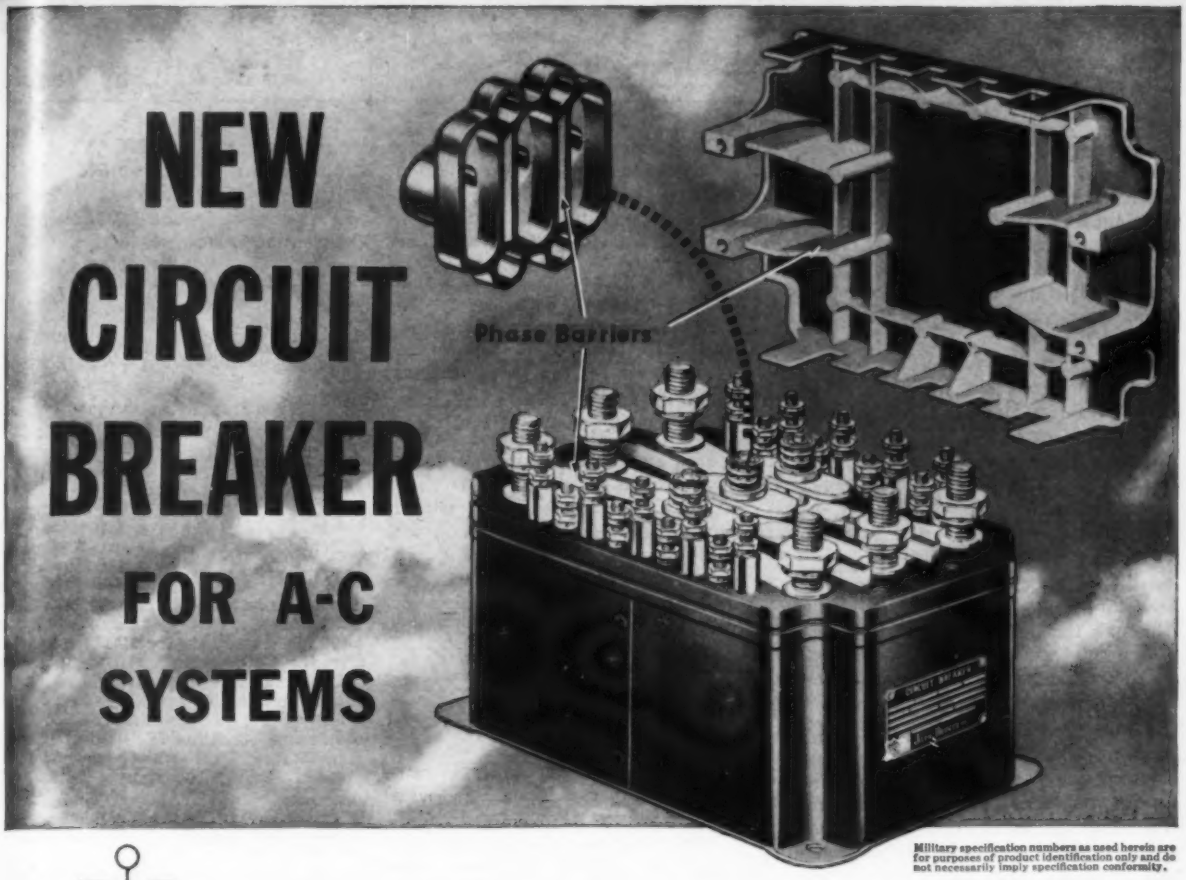
• •

Informed sources doubt the validity of the Japanese magazine *Aireview's* report that Lockheed's XF-104 has exceeded Mach 2, although there is the possibility it could have been accomplished in a dive. Asks too much of the Wright J65 engine, which powers the prototype. It will be a different story with the production model, which will have a bigger, more powerful engine, GE's new J79. The Japanese estimate that the F-104's ceiling is more than 69,000 feet also probably applies to the J79 version coming up, although the J65 is a very good performer at altitude and the XF plane undoubtedly has achieved some high numbers in this department.

• •

The difference in manufacturing theories is illustrated by Boeing's conviction that a prototype is a must on a jet transport, while Douglas favors going straight into production . . . North American Aviation's T-28C is the T-28B with a landing hook . . . Met-Co-Aire Co. has developed a tricycle landing gear installation for the Cessna 170 . . . Wonder how many Lockheed employes realize "1951," the company's experimental Constellation, has attained a true air speed of almost 500 mph? . . . Why, if the Russians are outbuilding us in the skies, they don't turn out transports like our DC-7s and Super Constellations, instead of flying Krushchev, Bulganin and Molotov around in "puny twin-engine jobs?"

NEW CIRCUIT BREAKER FOR A-C SYSTEMS



Military specification numbers as used herein are for purposes of product identification only and do not necessarily imply specification conformity.

Design features provide exceptional safety and ease of maintenance

This new Jack & Heintz Model 50086 Circuit Breaker is designed to meet MIL-C-8379A (ASG) . . . provides a continuous rating of 175 amperes (60 kva) . . . weighs but 4¾ pounds! Although an important part of the complete Jack & Heintz a-c system "package", it can be supplied as an individual unit if desired.

In addition to its main features described at right, this new breaker has many others that assure positive, trouble-free functioning under extreme environmental conditions. Here is another example of how Jack & Heintz continues to provide you with advanced electric systems and components through integrated engineering and manufacturing. For complete information write to Jack & Heintz, Inc., 17633 Broadway, Cleveland 1, Ohio. Export Department: 13 E. 40th St., New York 16, N.Y.

SAFETY FEATURES

- **Solid Copper Bus Bars**
  All bus bars are of solid copper. No flexible copper braids used!
- **Mechanical Phase Isolation**
  Straight-through path design of main conductors together with phase barriers permits complete mechanical phase isolation of all main conductors and contacts.

MAINTENANCE FEATURES

- **Easy Contact Inspection**
  As shown above, the special construction allows inspection of main contacts without disassembly.
- **Nylon Terminal Cover**
  Molded of high impact nylon, this cover can be removed easily by loosening four screws.
- **Accessible Auxiliary Contacts**
  All three connections for each auxiliary contact have been brought out to the terminal posts for ease of hookup.

ENGINEERS: Write for free booklet describing unusual opportunities for you at Jack & Heintz.

JACK & HEINTZ *Rotomotive* AIRCRAFT EQUIPMENT

International Aviation

By Anthony Vandyk

Passengers are having a hard time recognizing the identity of an aircraft which has recently taken on Air France markings and is being used on regular schedule between Paris and Nice. It is one of the few remaining Boeing 307 Stratoliners, a model that was once the flagship of the Pan American and TWA fleets.

Paris-Nice flights with this equipment are operated jointly by Air France and UAT-Aeromaritime, using two 307s, one in each company's markings. The two planes are actually owned by UAT, which inherited them and three others when it absorbed Aigle Azur.

• **Passengers riding** the 307s between Paris and Nice pay about 15% less than those electing to travel in Air France Viscounts between the two cities. Although the 307 was the world's first pressurized transport, the models operated by the French fly unpressurized and with high-density seating.

The French 307s are based at Le Bourget airport, Paris, which has one of the finest terminal buildings in Europe notwithstanding the fact that it is of pre-war construction. In a recent swing round Europe this writer noted that there are now few major airports without good terminal buildings. The new facility known as London Airport Central could well vie with Zurich's terminal for the title of the finest in Europe; both, incidentally, have well-equipped playrooms for children and baby "diaperies."

• **One of Europe's neatest** terminal buildings is at Turin airport which, although possessing excellent runway facilities and a variety of aids, is used by only one scheduled flight a day. By contrast Rome's busy Ciampino airport with three separate terminal buildings remains one of Europe's most chaotic spots; fortunately, completion of Ciampino's replacement, Fiumicino (construction of which started before the war), now seems likely within a couple of years.

While discussing airports and Boeing equipment it is appropriate to mention that it was the inauguration of an airport—San Juan's splendid new Isla Verde terminal—that gave this writer an opportunity to ride in a Super Stratocruiser of Pan American. Because the Boeing double-decker is now flown by only three airlines (BOAC, Northwest, and PAA), it is perhaps not sufficiently known or appreciated by the traveling public.

The Stratocruiser is certainly the roomiest of the existing long-haul transports, and the noise level is impressively low. There is an air of well-being aboard a Stratocruiser that is duplicated in no other landplane. The only other existing transports that bear comparison with the Boeing 377 in this respect are the almost forgotten SNCASE Armagnac and the still-to-be-proven Bristol Britannia. Both, however, lack that most popular feature of the Stratocruiser—the lower-deck lounge.

Martin, Piasecki Seek German Associates

Increasing U. S. interest in helping Germany's aircraft industry back on its feet was evident in the news that The Glenn L. Martin Company and Piasecki Helicopter Corp. are both looking for German associates. Martin is prepared to help finance a company for the subassembly and license manufacture of Martin products. It has negotiations in hand with several firms including Henschel, Focke-Wulf and Weser. Martin reportedly would be prepared to subscribe up to 49% of the new company's capitalization.

Piasecki Helicopter Corp.'s interest in the German market is connected with the intense interest shown by the German defense planning staff in rotorcraft. Sikorsky has already signed a sales agreement with Henschel and this may be extended to permit license production by the German firm. Bell has a sales agreement with a Hamburg firm, Hubschrauber-Vertrieb.

Meanwhile, reports from Europe indicate that French aircraft are commanding particular attention among the German defense planners. It is said that 50 Morane-Saulnier MS 733 piston-engine trainers may be bought and the Fouga 170 Magister stands a good chance of being selected as the German Air Force's standard jet trainer. There is also a likelihood that the German-designed, Spanish-built Dornier Do 27 will be used as a communications aircraft by the German armed forces.

Manufacturing Briefs

Piago & Co. has a four-turboprop flying boat in the design state; the Italian aircraft is expected to require 4,000-hp engines . . . Four prototypes of the **Agusta** AZ-8, Italian "DC-3 replacement," are to be built: two flying, one for static destruction tests, and one for fatigue tests; first phase of manufacturing program is scheduled for completion in early November, first flight of the plane for July 1956 . . . Maximum continuous power of the **Rolls-Royce** Dart RDa6 is to be increased from 13,800 rpm to 14,200 rpm

Transport Briefs

East Germany's Lufthansa will start operations on September 1, linking Berlin with Prague, Dresden and Warsaw, using Ilyushin Il-12 equipment . . . **Brazilian airline VASP** took delivery of two of its four new Saab-90 Scandias in Sweden July 19, with two more to follow in about six weeks; the four Swedish twin-engine transports, plus two recently delivered to Scandinavian Airlines System, were constructed in Sweden but assembled in Holland by Fokker, Aviolanda, and De Schelde . . . **Indian Airlines** has placed a firm order for five Viscounts to be delivered in 1957—one each in July, August and September; two in October

FOLLAND GNAT lightweight fighter, damaged in an emergency landing last month, should be flying again late this month but may have accumulated sufficient flying time to appear at next month's Farnborough show.

New Aero Commander Larger, Faster Than Any of Its Predecessors

MODEL 560A—AERO COMMANDER is the third, fastest and largest in its line. Executive plane, one of which is being used by President Eisenhower, has sleeping, eating accommodations.

A new model of the twin-engine Aero Commander executive aircraft, larger and faster than its predecessors, has been announced by Aero Design & Engineering Company. Now in production, the new model, designated the 560A, has been priced at $74,500.

Major innovations in the third version of the Aero Commander are:

• **A 10-inch addition** to the fuselage provides a larger cabin with more space in the 6-7 place seating arrangement and allows several different configurations for the standard five-place cabin.

• **New 275 hp. GO-480-D1A** Lycoming dry sump engines increase the plane's power by five horsepower over the old engine.

• **Redesigned enlarged nacelles** completely house the augmentor tubes, leaving only the extreme rear tip extended aft to exhaust engine gases thus providing a 15% increase in cooling efficiency, while the nacelle walls muffle exhaust sounds from the cabin.

• **New main landing gear** has a 4-degree forward slope in its down position and is mounted on a redesigned and simplified structure extending down from the wing.

• **Increased cruise speed** of 204 mph and high speed of 211 mph has resulted from the increased horsepower and improved streamlining of the nacelles and cabin.

Long-range tanks are being made available as optional equipment. Located outboard of the nacelles, the tanks carry 80 gallons of fuel, supplementing the 157 gallons in the regular system. Additional tanks increase the plane's maximum range from 1,000 miles to more than 1,650 miles. Three-blade propellers and dual vacuum systems have been made standard equipment.

• **Unusual feature** in the optional interior equipment is a hassock-chair that may be used to replace the center seats. The adjustable hassock can be converted to a chaise lounge or, in conjunction with the rear seat, a bed. In addition, a hinge-covered insulated section of the chair can be fitted for use as an ice box or chemical toilet.

Tuck-away tables have been added, as well as adjustable rear seats that can recline to a 30-degree angle.

Cargo conversion has been simplified. Chairs are removed on movable tracks within 15 minutes. Cargo hold-down straps attach to the chair rails and fittings.

R. T. Amis, company president, in announcing the new model, also revealed that plans were under way to expand production facilities in the Oklahoma City area. Besides being in full production on the new model, the manufacturer is fulfilling an initial Air Force contract for 15 Aero Commanders and has had a notable acceleration in orders since President Eisenhower began using the plane for short haul trips. • • •

Business Planes Called Aid to N. Y.'s Growth

Use of business airplanes has accelerated industrial and commercial expansion of New York State according to Claude B. Friday, state director of aviation.

In a speech delivered before the Tri-Cities Aviation Forum in Binghamton, Friday noted that not only have busy executives "slashed travel time and gained important competitive benefits by use of privately owned planes," but bookings on commercial airlines and air charter services have increased "through creating greater awareness among New York businessmen of the convenience of air transportation."

Friday disclosed that a recent Bureau of Aviation Safety study had shown that of the 82 firms in the state operating business aircraft, 35 reported no decline in use of airlines; 25 found an increase in airline reservations, and 22 companies reported a decline in the use of airlines due to their own plane operations.

The survey also disclosed that seven out of eight firms reported that use of company-owned aircraft has boosted productive time of key personnel. Nearly half of the firms noted an immediate drop in travel expenses due to operation of their own planes.

Executive Aircraft Co. Plans Plane Center

Executive Aircraft Co. has announced plans for development of a $500,000 private plane center at Kansas City Municipal Airport. It is the first fixed-base operator at the field to announce publicly plans for moving its facility, following city council action requiring that all such operators move from the east side of the field to make room for terminal building expansion.

The city council action followed a long and bitter fight, in which general aviation interests accused the city of trying to push them off the field entirely.

Plans for EAC's center call for building an office and maintenance buildings and hangars on a 16-acre tract which will be north of the hangars occupied by Slick Airways. Ten metal hangars will provide T-storage facilities for 100 aircraft.

Schedule calls for the facilities to be completed during the spring.

Trend of the Times

With the increasing interest and development of small jet aircraft for the business user, Shell Oil Co. issued a statement recently to reassure potential users about the availability of jet fuel. J. S. Harris, aviation manager, noted that there "has been some question about fueling jet-powered executive aircraft because the fuel they burn is not now available at most airports." He said fuel and special oil will be available to several hundred Shell airport dealers throughout the U. S. "as soon as there is a demand for it."

STOP
ON TIME

The B-47 Jet Bomber is built to GO and go it does with a speed that challenges the imagination (London, England to Limestone, Maine in 4 hours and 43 minutes) even in this day of supersonic speeds by smaller planes. But when it's time to come down, landing and stopping this 6-jet aircraft must be done with both accuracy and dependability. To accomplish this, Boeing Airplane Company uses Pioneer specially-built deceleration 'chutes to approach the runway and larger ribbon 'chutes to shorten the landing roll — a maneuver that has won the praise of the aviation industry — of which Pioneer is proud to be an integral part.

PARACHUTES MAKE THE DIFFERENCE!

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Business Flying

Private, Corporate Users Seen As Big Market

The Royal Liverpool Insurance Group of New York City has labeled the private and business aircraft users "a big market" in a specially-prepared aviation information brochure for its agents and customers. It notes that 97% of the 60,000 active civil aircraft fall into this category with the airline transports in a small minority.

The company points out that the corporate owner is "the largest growing group and in many respects is the mainstay of private flying." The brochure contains data on the types of planes currently in use and describes the three main areas of aviation insurance coverage for general aviation, including aircraft, airport and personal aviation accident.

New Montreal Plane Center

Montreal's Dorval Airport will have a private and executive aircraft center this month when Timmins Aviation opens its new service facilities. Owned by John A. Timmins, the business aviation center will offer full overhaul, maintenance and other facilities for business aircraft. Jack Graham has been named manager with John Luty, former maintenance director for Hollinge Ungave Transport, head of the maintenance staff.

★★ **Donald W. Douglas, Sr.,** Douglas Aircraft Co. President, Santa Monica, Calif. (35 yrs.)

★★ **George A. Strompl,** Douglas Aircraft Co. Coordinator, Santa Monica, Calif. (35 yrs.)

★ **H. E. Weihmiller,** Republic Aviation Corp. Development engineering dept., Farmingdale, L.I., N.Y. (30 yrs.)

Capt. Victor A. Wright, Pan American World Airways. Captain, Miami.

Frank L. Foster, Pan American World Airways. Staff asst., international relations department, Miami.

William E. Marley, Pan American World Airways. Foreman, Miami.

Warren Erickson, Trans World Airlines. Inspector, Los Angeles.

Capt. Lionel Machado appointed vp-operations; **George Tanabe,** asst. secy. and asst. treas., Hawaiian Airlines.

B. H. Tumey appointed controller of Trans World Airlines, replacing **M. J. Plodinec** who has resigned.

Roland Frost made manager for Braniff International Airways in Sao Paulo, Brazil.

Books

Commercial Air Transportation. . . . .

By John H. Frederick. Fourth Edition. Published by Richard D. Irwin, Inc., Homewood, Ill. 547 pp. Price: $6.

A revised, up-to-date textbook on the swiftly-changing history of air transportation, containing a well-balanced economic analysis of the industry. The author is professor of transportation and head of the department of business organization, College of Business and Public Administration, University of Maryland. Profusely illustrated with photographs, tables and charts, the book covers the field thoroughly.

Brand of the Tartan.

Huck. Published by Appleton-Century-Crofts, Inc., New York. 260 pp.

This book tells the story of the Minnesota Mining and Manufacturing Co., which has been called one of the best-managed American corporations. Organized in 1902 to exploit a deposit of corundum, the company failed to achieve success until it started manufacturing sandpaper. Today "3M"—as it is called—makes 25,000 different items, including Scotch Brand tapes.

Flight Handbook.

The Theory and Practice of Aeronautics, compiled by the staff of Flight. Fifth edition. Published by Philosophical Library, 15 East 40 St., New York 16, N.Y. 282 pp. Price: $600.

This broad survey of aircraft design, first published in 1938, has been completely rewritten and considerably enlarged. Chapters include consideration of theory of flight, as well as structures, powerplants, armament, instruments, etc.

Jane's All The World's Aircraft.

Edited by Leonard Bridgman. Published by The McGraw-Hill Book Company, Inc., New York. $25.00. 379 pp. plus index.

This is the 1954-55 edition of a standard aviation reference book. Although in recent years Jane's has been considerably reduced in size, involving the curtailment of the airlines section and elimination of the military section, the volume is still the best source of general information for the world's aircraft and engines. It is, as usual, well printed and very carefully checked for accuracy (because of this the publication is inevitably somewhat out-of-date by the time it reaches the reader).

The aircraft section comprises 264 pages and contains descriptions and specifications of aircraft produced in 30 countries. . . . AV.

for **TRUE**

HERMETIC

SEALING

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And on arrival your luggage is delivered with extra speed from a special cabin-level compartment—another United Air Lines "exclusive"! For reservations, call or write United Air Lines or an Authorized Travel Agent.

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TRANSPORT TRENDS Washington, D. C., August 15, 1955

TOP CHOICE OF THE REPUBLICAN NATIONAL COMMITTEE to succeed Civil Aeronautics Board Member Josh Lee is Federal Maritime Board Member G. Joseph Minetti, a New York Democrat. Minetti, 48, joined Maritime last year when that board was under the leadership of Louis Rothschild, currently Undersecretary of Commerce for Transportation.

THE NEW INTERCHANGE AGREEMENT for New York-Latin America service signed August 4 by Pan American, Panagra and National opens the door for a hot competitive fight between that group and the Braniff-Eastern faction that signed a month earlier and plans to inaugurate service August 18. Immediate aim of Pan American et al after CAB approval was to get service going first with the most frequency.

NONSCHEDULED AIRLINES ARE EXPECTED to get a green light from CAB on the future carriage of individually-ticketed passengers when the Board announces its decision soon in the Large Irregular Air Carrier Investigation.

During the late July and early August discussions, at least three members of the Board felt there is more room in the air transport field for nonskeds with good records than the strict charter role recommended by CAB's staff and examiners.

Since only half of the 60-odd applicants have been heard in the case, however, further hearings on fitness etc. of the remaining carriers probably will be required to determine whether they qualify for the liberal authority expected to be granted.

THE TACAN VS. VOR/DME DISPUTE is expected to be settled by November, at the latest.

Advisory Committee No. 3 of the Air Navigation Development Board has concluded its report on operational requirements, but contracts to the National Bureau of Standards and Airborne Instrument Laboratories for TACAN coverage capabilities and number of interference-free channels, respectively, have been extended to the fall.

The advisory report reveals that neither of the two navaid systems meets minimum requirements, and neither has the edge on coming close. VOR/DME fulfills some aspects that TACAN doesn't, and vice versa. The interference-free channels being evaluated by AIL reportedly will be the deciding factor.

IMPROVING SAFETY RECORD OF U. S. domestic and international airlines hit a new high during 1954 with a fatality rate of only .075 per 100 million passenger miles, the official CAB analysis released early this month shows. They carried 35.2 million passengers 21.9 billion passenger miles. It was the third consecutive year that the fatality rate was below 1.0 per 100 million passenger miles. The record:

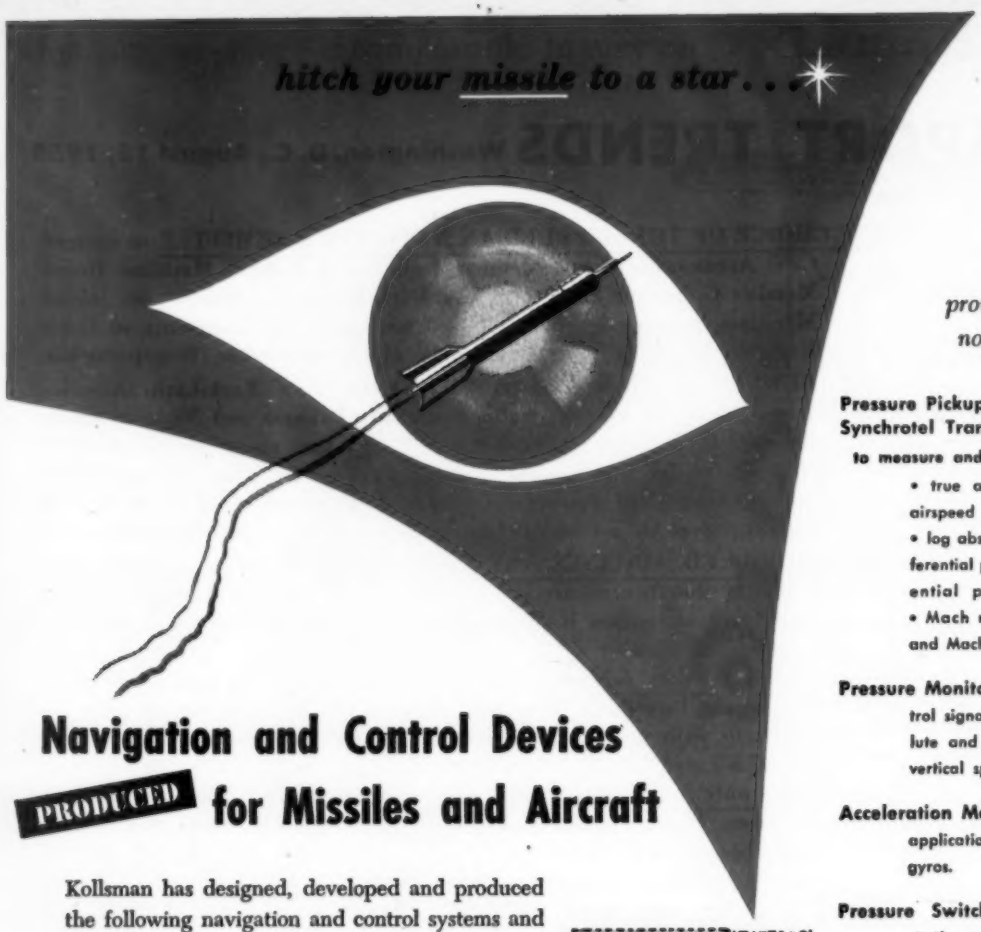
Trunks: A total of 32.3 million passengers, 17.4 billion passenger miles, 536.4 million plane miles, 16 fatalities.

Local Service: A total of 2.4 million passengers, 486.7 million passenger miles, 48.8 million plane miles, no fatalities.

Territorial: A total of 558,000 passengers, 75.2 million passenger miles, 4.1 million plane miles, no fatalities.

Foreign/overseas operations surpassed 1953 records with 2.9 million passengers, 3.9 billion passenger miles, 111.5 million plane miles, no fatalities.

Large irregular carriers in both domestic and international service had no fatalities while flying 654.3 million passenger miles and 15.7 million plane miles. These carriers had eight fatalities in domestic service and 58 in international operations during 1953.



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CAB Moves to Strengthen Regional Trunks

• Big Four likely to get "move over" orders in markets where board feels more competition is warranted.

By WILLIAM V. HENZEY

There is a marked trend in the current wave of new route cases before the Civil Aeronautics Board indicating that the regional domestic trunklines are likely to be strengthened in the near future. Also, there is a definite, though obviously still unofficial, desire within the Board to use pending route cases as a means of bringing about an entirely subsidy-free domestic trunk industry.

All of which appears to foretell a series of "move over" orders to the Big Four in traffic markets which various CAB Members feel are strong enough to support additional competition.

• **Latest significant development** was the report of Examiner Ferdinand D. Moran in the Denver Service Case. He recommended strengthening of regional carriers Western Air Lines and Continental Air Lines and denial of several "Big Four" applications, two of which were generally viewed as "in the bag."

For Western, a non-subsidized regional line with a 1954 operating profit of $2 million, Moran recommended a new Denver-San Francisco route via Salt Lake City and Reno. According to WAL's figures, the route would produce an additional $1.5 million net operating income annually.

For Continental, a subsidized regional line with a 1954 operating profit of about $1 million, Moran suggested westward extension from Denver to Los Angeles and eastward extension from Kansas City to Chicago. Not only would this make Continental self-sufficient, saving the Government $1.3 million in subsidy payments, but according to Moran, it would give CAL an additional net profit after taxes of $1,164,670 and a system net of $1.7 million.

In addition, the Examiner suggested an east-west interchange service over Chicago by Continental and Capital Airlines, a non-subsidized regional with a 1954 operating income of $2.4 million. Aim is to provide new one-plane service for Denver and Kansas City to and from the east.

• **But for the Big Four** aspirants in the case, the story was different. Trans World Airlines, whose application to add Denver to its transcontinental Route 2 prompted the case, and whose 1954 net operating income was $18.1 million, would get nothing.

United Air Lines, which had a $21.4 million operating income last year and stands to lose most by added competitive services in the Denver market, and which figured prominently as a candidate for new service to Kansas City, would also get nothing.

American Airlines, with a $21.4, million operating profit last year would salvage something for the big lines if Moran's report is adopted, although it would be at the expense of United and TWA largely. The Examiner recommended against AA's bid to serve Denver but favored lifting restrictions on service to the west coast, the result of which would place AA in such nonstop markets as New York-San Francisco and Detroit-Los Angeles.

• **Thus, if finally accepted** by CAB, Moran's recommendations contemplate that Continental would be dropped from the sudsidy list, while two low-profit regional lines, Western and Capital, would be made stronger.

This becomes more significant industry-wide when viewed in connection with several other developments.

One was the previous report of Examiner William F. Cusick recommending new Chicago-New York rights for Capital and Northwest Airlines, the latter also a comparatively low-profit carrier with a $3.3 million net operating income last year.

Another is CAB's repeated refusal to slow down the latest merger agreement which would find Eastern Air Lines absorbing Colonial Airlines thereby eliminating the latter from the subsidy ranks. When coupled with Moran's recommendation for Continental, this would reduce the present four subsidized trunks to two—Braniff Airways and Northeast Airlines.

Braniff, through its progress under new president Charles E. Beard in the past year, is expected to go off subsidy domestically in the very near future. It has a Chicago-Detroit application pending in the Chicago-New York Case and a New York extension application in the Additional Southwest-Northeast Service Case. If the current trend holds true, Braniff stands to be strengthened in either or both of those cases.

A NEW $7-MILLION office building and hangar will be constructed by Continental Air Lines at Stapleton Airfield, Denver, on a 34-acre tract west of its present headquarters. Construction is expected to start this fall and will be completed in early 1957. Office building, including a restaurant, will contain 107,500 sq. ft. There will be 159,000 sq. ft. in the hangar plus 97,500 sq. ft. for shops and overhaul units. Overhaul-maintenance bays will accommodate six DC-6Bs and four Convair 340s.

Northeast, meanwhile, is one of the strongest contenders to become the third carrier operating between New York and Miami. If it achieves that objective, NEA would drop out of the subsidy ranks.

• **As one high CAB official** put it recently, while there may be a dissenting vote here or there, the Board now has it within its power to make the entire U.S. trunk industry free of subsidy "with a few strokes of the pen."

To sum up, there are nine trunks other than the Big Four. Four of the nine are subsidized, leaving five non-subsidized and relatively low-profit regionals. The four subsidy carriers stand to be removed from the subsidy list. Of the five remaining non-subsidized regionals, Moran and Cusick recommend strengthening routes for Western, Capital and Northwest. This leaves Delta-C&S Airlines and National Air Lines to be dealt with.

CAB's staff favors granting Delta's long-time bid for extension of its routes to New York in the Additional Southwest-Northeast Case; in fact, a San Antonio-New York route has been suggested. As stated, Braniff is also in a position for a New York extension in that case, and Capital has Board staff support for new rights between New York and New Orleans.

• **National, on the basis** of recommendations thus far, must be classed with the Big Four as a potential recipient of "move over" orders. National's "bread and butter" route—New York-Miami—is the object of "third carrier" aspirants in the New York-Miami Case.

However, National has a pending application for a New York-Chicago coach service, northward extensions in the New York-Florida Case, and is one of four aspirants for trans-Gulf rights between Miami, Tampa and Houston. Its affirmative cases, therefore, are not far enough along at this point to determine whether or not it will fit in the strengthening pattern apparently shaping up for the other regional lines.

As a clue to how this will unfold in final form, it should be noted CAB plans to announce its decision in the New York-Chicago Case by late August or early September. The Denver Case will be scheduled for oral argument in the early Fall and decision is likely by about October.

The Examiner's report in the Southwest-Northeast Case is not yet completed but CAB hopes to wind up the case before the year is out. Hearings in the New York-Florida Case are still in progress and a decision before early 1956 is unlikely. • • •

Comparison of Domestic Trunk Airline Services By Cities

Following table illustrates the number of variously sized cities served by each of the domestic trunk lines. The cities are classified in line with CAB's determination of new multi-element mail rates for the industry. Based on their revenue-tons of all traffic enplaned per year, cities are classified as follows: A—7,000 tons and over; B—750 to 6,999 tons; C—60 to 749 tons; D—59 tons or less.

PERCENT OF STATIONS IN EACH CLASS

		A	B	C	D	Total
American:	Number of Stations	40	15	8	—	63
	Percent of Total	63.49%	23.81%	12.70%	—	100.00%
Braniff:	Number	18	22	19	—	59
	Percent	30.51	37.29	32.20	—	100.00%
Colonial:	Number	6	8	9	—	23
	Percent	26.09	34.78	39.13	—	100.00%
Continental:	Number	8	6	13	2	29
	Percent	27.59	20.69	44.83	6.89	100.00%
Capital:	Number	23	22	7	—	52
	Percent	44.23	42.31	13.46	—	100.00%
Delta:	Number	20	23	9	—	52
	Percent	38.46	44.23	17.31	—	100.00%
Eastern:	Number	36	32	16	—	84
	Percent	42.86	38.09	19.05	—	100.00%
National:	Number	11	12	6	1	30
	Percent	36.67	40.00	20.00	3.33	100.00%
Northeast:	Number	5	8	18	3	34
	Percent	14.71	23.53	52.94	8.82	100.00%
Northwest:	Number	12	8	9	1	30
	Percent	40.00	26.67	30.00	3.33	100.00%
TWA	Number	25	14	3	—	42
	Percent	59.53	33.33	7.14	—	100.00%
United	Number	27	24	15	1	67
	Percent	40.30	35.82	22.39	1.49	100.00%
Western	Number	11	11	16	4	42
	Percent	26.19	26.19	38.10	9.52	100.00%

TOTAL STATIONS IN EACH CLASS

Total Stations in Class		70	127	132	12	341
American:	Number of Stations	40	15	8	—	63
	Percent of Total	57.14%	11.81%	6.06%		
Braniff	Number	18	22	19	—	59
	Percent	25.71	17.32	14.39		
Colonial	Number	6	8	9	—	23
	Percent	8.57	6.30	6.82		
Continental	Number	8	6	13	2	29
	Percent	11.43	4.72	9.85	16.67	
Capital	Number	23	22	7	—	52
	Percent	32.86	17.32	5.30		
Delta	Number	20	23	9	—	52
	Percent	28.57	18.11	6.82		
Eastern	Number	36	32	16	—	84
	Percent	51.43	25.20	12.12		
National	Number	11	12	6	1	30
	Percent	15.71	9.45	4.55	8.33	
Northeast	Number	5	8	18	3	34
	Percent	7.14	6.30	13.64	25.00	
Northwest	Number	12	8	9	1	30
	Percent	17.14	6.30	6.82	8.33	
TWA	Number	25	14	3	—	42
	Percent	35.71	11.02	2.27		
United	Number	27	24	15	1	67
	Percent	38.57	18.90	11.37	8.33	
Western	Number	11	11	16	4	42
	Percent	15.71	8.66	12.12	33.33	

House Group To Study Transport Policy

House Commerce subcommittee will meet during Congressional recess for detailed study of the report of President Eisenhower's Advisory Committee on Transport Policy and Organization.

Document was first published in April and has since drawn wide criticism for favoring railroads over other forms of transportation.

First House sessions are scheduled September 19. Commerce Secretary Sinclair Weeks, chairman of the Presidential group, will open the hearings and explain views expressed in the report. Weeks will be followed by representatives of affected transport industries who have been invited to comment on principles and proposal the report contains.

Air Cargo Story: Slow But Steady Growth

- **Long-range potential good but sales push is needed.**
- **All-cargo lines picking up after two-year slump.**

BY ERIC BRAMLEY

Is air cargo living up to expectations?

The answer is: it is and it isn't.

It is now running twice the ton-miles of mail.

Domestically, it's bringing in twice as much revenue as mail pay and subsidy. But its *rate of growth* has lagged behind passenger-miles. It still accounts for only 5% of total trunk airline revenues.

However, there are indications that freight and express may be finally turning the corner. At least some experts think so.

•**Cargo is now getting** a bigger sales push from at least some managements. The reasons:

With more sales emphasis, it has good long-range growth potential. Most trunks have been subsidy-free since 1951. Since then, mail revenue (and a small amount of subsidy) has held relatively steady. Cargo passed mail as a revenue-producer in 1951 and has grown, even without major sales effort.

More cargo lift is becoming available. Airlines in past few years have been integrating more big aircraft into their fleets—DC-7s, DC-6s, Constellations. Emphasis has been on filling added seats; passenger-miles jumped 106.8% in 1950-54 period, cargo ton-miles 23% (trunks plus all-cargo lines, 20%). But the cargo space is there to be filled.

•**Big jump** in all-cargo plane lift comes next year. American adds four DC-6As to its present three DC-6As and nine DC-4s. United adds five DC-6As to 10 DC-4s. Both are expanding terminal facilities. They're pushing sales.

Will other trunk managements also expand cargo activity? Next 12-24 months will tell. If they do, cargo will turn the corner, spurt ahead, experts feel.

International field holds promise. Mail revenue plus subsidy is still way ahead of cargo, only slightly ahead without subsidy. Cargo ton-miles are 1½ times mail. New International Air Transport Association Atlantic rate structure, cutting rates and changing commodity classifications, holds big hope as a volume-producer. Cargo capacity is now being boosted.

• **All-cargo lines** have slumped. They're 21% below 1951 ton-mile peak; traffic fell off between 1953 and 1954. Big gain is needed this year to make up lost ground. Trunks outhaul them by at least 78% (not including express). They've had merger troubles; competition has been getting tougher. At least two big freight forwarders prefer combination lines, give them all their business.

Trunks claim all-cargo lines can never match them in efficiency and economy; they call all-cargo experiment a "failure." But don't discount the freight lines. They hauled 82.2 million ton-miles last year, took in $14 million freight revenue, were off to a good start in the first part of 1955.

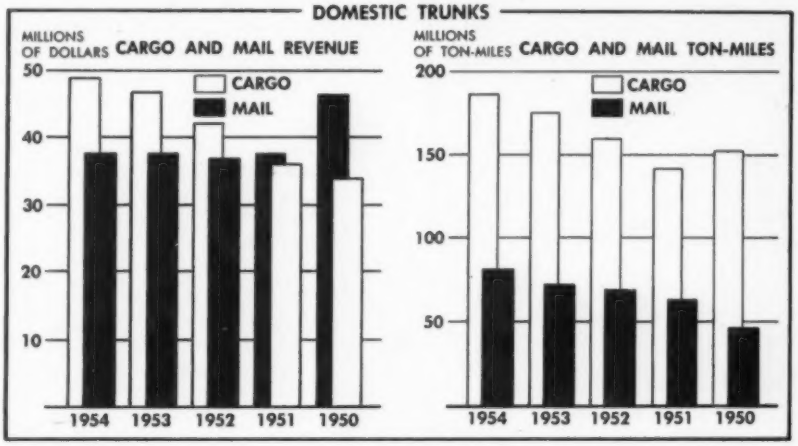
Cargo revenues as a percentage of total operating revenues fell in the domestic field between 1950 and 1954. In 1950, trunks received 6.5% of revenue from cargo. Depletion of cargo fleets caused by the Korean war, plus emphasis on filling added seats, dropped this to 4.9% in 1954, but the first quarter of this year showed an upturn (slightly over 5%). International carriers held relatively steady, in a range from 8.8% to 8.3%.

Two of the largest freight forwarders, who are top buyers of airline cargo services, are watching developments closely.

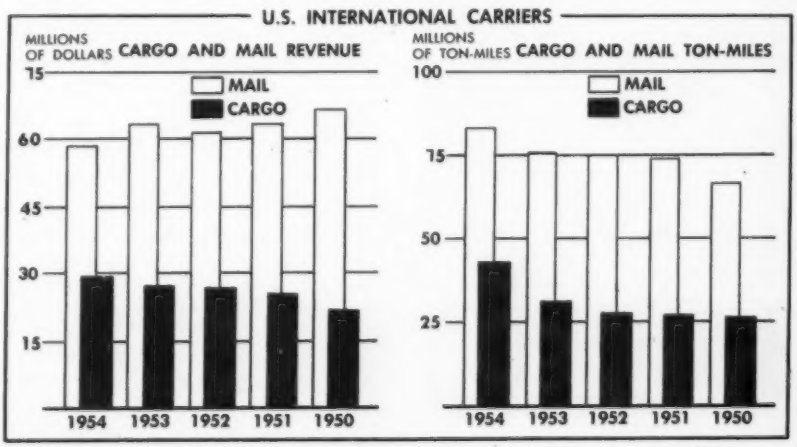
• **Says Charles L. Gallo,** president of Air Express International: "This year may see the real dawn of the air cargo age. The really big jump in sales activity, at least on the part of the domestic leaders, is taking place today. The emphasis is on developing cargo."

Gallo, who operates primarily in the international field but who also is increasing his domestic representation, told AMERICAN AVIATION: "Freight revenues can exceed passenger revenues in the foreseeable future. If other carriers' sales efforts follow those of American and United, the time when this will happen can be shortened by 10 years."

A principal deterrent to development of cargo has been lack of lift,



Mail Revenues include Federal Subsidy. Cargo includes Express and Freight.



Mail Revenues include Federal Subsidy. Cargo includes Express and Freight.

he said. This is about to be alleviated by addition of more DC-6A's. Looking beyond the DC-6A, he has high hopes for Lockheed's C-130 as a cargo aircraft.

"Profit possibilities can be greater in cargo than in passengers," he noted. "The combination carriers have got to do some soul-searching, particularly on allocating the cost of cargo carrying. A combination line can operate a cargo plane more economically than an all-cargo line, provided an honest and factual cost allocation is followed." He pointed out, for example, that cargo aircraft shouldn't be saddled with many of the maintenance costs that are charged against passenger planes.

In the international field, he said: "Last year there were 30 million tons of ocean freight out of New York. Of this total, 10 million tons were general cargo which might be subject to diversion. A diversion of 1/10th of 1%—10,000 tons—would double what the IATA airlines carried both ways between the U.S. and Europe last year (9,753 tons).

"This can well happen within the next year with the new IATA cargo rates."

• **AEI's billings** to customers have jumped from $1 million in 1949 to a current rate of $8 million a year. It handled 5 million lbs. of international export cargo last year, and may reach 9 million lbs. this year. It operates abroad through managing agency agreements with local forwarders—England, Switzerland, West Germany, Holland, Philippines and others, reaching 300 destinations. In France, Italy and Belgium it formed separate corporations, turning over control to local people, and giving the companies managing agency agreements.

Domestically, AEI has offices in 11 locations. It also has agreements with United, Capital and Mohawk, under which these airlines represent AEI in 71 cities. These agreements provide for exchange of documents and through movement of shipments from airline offices in these cities to connecting overseas carriers with AEI's tariffs and expediting procedures and with the entire move under AEI responsibility. All transportation, domestic and international, is via combination carriers.

• **John C. Emery,** whose Emery Air Freight Corp. is the leader in the domestic field (buying close to $3 million of freight service from airlines this year), said the carriers will get a larger and larger proportion of income from cargo. "They're showing more interest in it now."

"Availability of lift has been our biggest need. We have experienced quite a number of shortages in the past. The need for more lift is a chicken-and-egg proposition. Which comes first—lift or traffic? Personally, I think lift comes first; we have found that volume responds to capacity."

Air freight "won't take the place of trains or trucks, but it will take a more respectable percentage of the total freight," Emery said. And he can visualize the day when air freight revenues will overtake passengers. Although air freight revenues have been increasing, they accounted for only 0.2% of total domestic freight revenues in 1946 and 0.6% in 1953. They may amount to 1% of the total by 1959 and perhaps 2% by 1972, he added.

• **The cargo sales** job that must be done must be creative, he pointed out. "Each new form of freight transportation, like air freight, has been both more expensive and faster than its predecessors . . . and each has achieved full development only when industry has adjusted itself internally to produce an overall economy from planned employment of the new, faster, more expensive form of transportation . . .

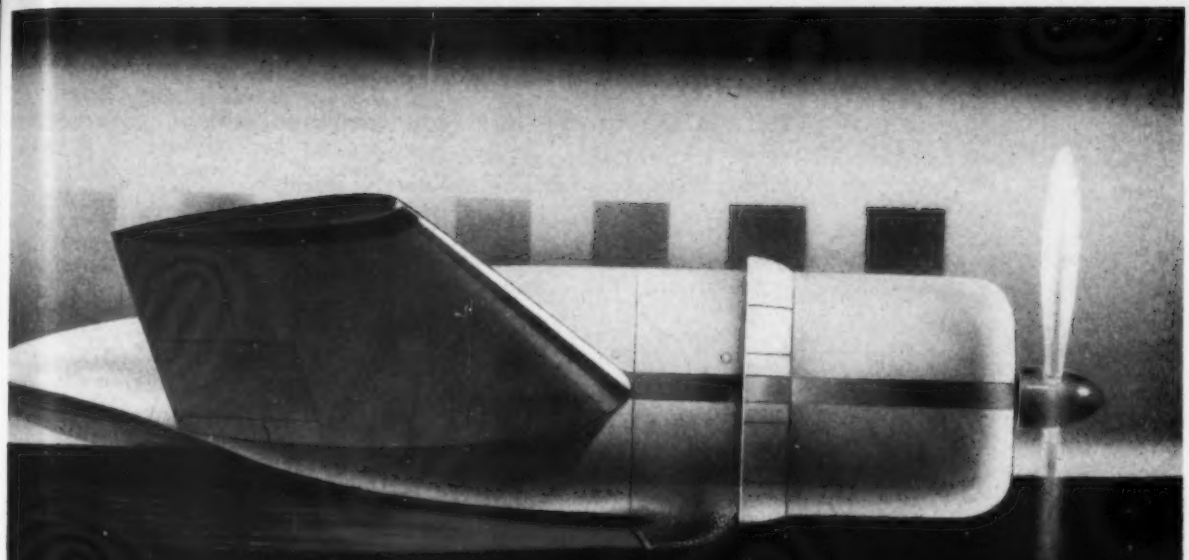
"Because all industry is built around transportation, you will recognize that many industrial methods, facilities with their attendant payrolls, and shipping procedures as well are dictated by distance—distance in terms of surface transportation speed. And that is our chance, because air transportation speed removes distance and the costs to industry—not transportation costs—that result from it."

• **Emery last year** handled 205,000 shipments weighing 19.3 million lbs., serving an average of 7,047 customers a month. It has 29 offices plus 72 agents in the U. S., Canada and Alaska.

Although described as a forwarder, Emery actually offers a "controlled, monitored" service called "blue ribbon" and its average airbill is less than two shipments. It follows a shipment step by step until delivery, notifies the shipper of exact time of delivery (it has its own extensive teletype system). A variety of other services are also offered.

"We move freight by air in hours, not days," John Emery said. "For this reason we've found the scheduled airlines most satsifactory. They operate with a greater degree of frequency and reliability."

He has stated that his aim is "overnight service between any two cities you care to name—the best cargo service in the U.S." In a recent month, 7% of shipments were picked up and delivered the same day; 89.8% were delivered the next day. • • •



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Swissair is Vital Link in Swiss Economy

- **Airline did $25.5 million volume last year, compared with $955,000 in 1945.**
- **Government participation in company relatively small.**

By ANTHONY VANDYK

ZURICH—If Swissair seems to be more closely identified with Switzerland than is the national carrier of any other country, it is because air transport is vital to this nation without seaports. Swissair is the only national enterprise that transports passengers and merchandise between landlocked Switzerland and overseas points. Since Switzerland lives to a large extent from tourists and exports, it is important for the nation's economy that as much of this traffic as possible is carried by Swiss concerns.

Despite its close association with the Swiss national economy, Swissair is one of Europe's flag carriers with relatively small government participation. Private interests hold 70% of the company's $3,220,000 capital and have two-thirds of the seats on the board of directors.

The only subsidy that Swissair gets from the government is $115,000 a year toward the training of aircrews. Since most flying personnel are also members of the Swiss Air Force, their training is deemed to be of military value to the nation.

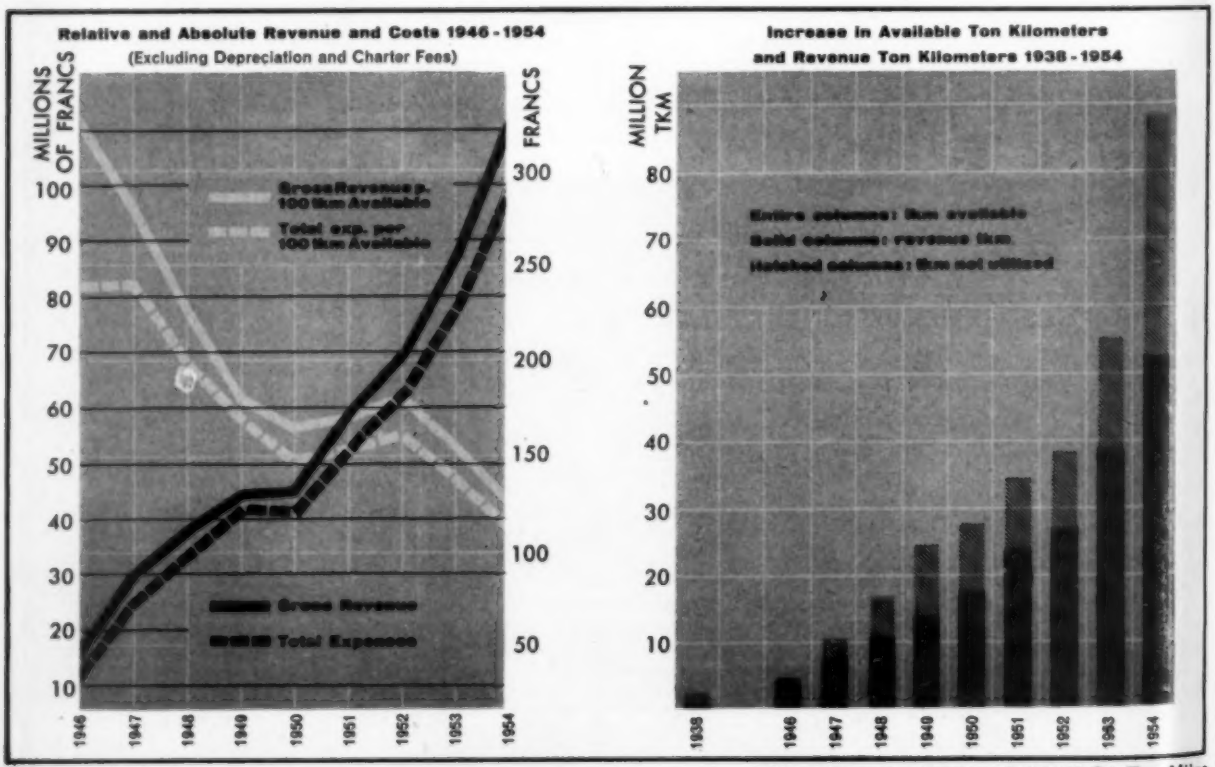
• **Another form** of financial assistance was given to Swissair by the government as an exceptional measure in 1949. This was the purchase of two DC-6Bs by the government under a $3,450,000 loan. The aircraft are leased to Swissair at an annual rental of one-seventh of their cost. On completion of these payments the aircraft become Swissair's property. Thus the Swiss government in effect made Swissair an interest-free loan repayable over seven years. Swissair's subsequent aircraft purchases were made by the company itself without such government assistance.

The Swiss government also undertook in 1949 to guarantee the amortization of Swissair's aircraft up to not more than $345,000 a year and for a total sum of not more than $3,450,000 if the company is unable to amortize them under its statutory procedure. Swissair has not in fact needed to avail itself of this facility, since from 1950 on it has always made a profit and paid a dividend of 4%.

• **Swissair today** is big business. Its turnover last year was $25,500,000 against $955,000 in 1945. Although in 1954 Swissair passengers on the New York route totaled only 20,000 against 350,000 on European services, 33% of the airline's operational revenue came from the North Atlantic route compared with 49% from European runs.

The Swissair management is fully aware of the economic advantages to be gained from the operation of long-haul routes and is planning to inaugurate more long-distance services, probably to India and the Far East, and to reopen the route to South Africa which was once operated on a "special flight" basis (South Africa has now agreed to scheduled operations).

Nevertheless, most of Switzerland's visitors come from neighboring European nations, and thus Swissair is forced to operate a predominance of short-haul routes. Moreover, the majority of tourists wish to visit Switzerland either in the warm summer months or, to a



1 Ton Kilometer (tkm) = 0.685 (U.S.) Ton Miles

much lesser extent, in the three winter months when snow conditions are suitable for skiing. Thus the airline suffers badly from peaks and valleys in traffic which cannot be offset by engaging temporary personnel for the busy periods, since most staff members need to be highly trained.

Swissair is making a tremendous effort to reduce peaks and valleys on its European runs by various methods. It is a firm advocate of more frequent services at lower fares as a means to attract a new class of traffic. The company believes that the present high fares restrict utilization of aircraft and thus create a vicious circle of higher costs and—ultimately—higher fares.

• **Swissair's philosophy** is that on short routes there should be frequent services with relatively small-capacity aircraft rather than infrequent flights with high-capacity planes. For this reason the company believes that the DC-3 can do a useful job for several years. It considers that for short runs the aircraft's relatively low speed and lack of pressurization are not important.

Swissair has nine DC-3s and has converted all of them from 21 seats to a 26-seat configuration and, in doing so, achieved a weight saving of 200 pounds per aircraft.

While retaining its DC-3s for secondary short-haul services Swissair is using Convair 240s for most of its first-line European services, supplemented in the case of the Zurich-London run by DC-6Bs. One of the most frequent questions asked of company officials is about future regional equipment.

It is clear that while Swissair is impressed by the qualities of the Viscount, to which it has lost considerable traffic on three key routes, the company prefers to remain loyal to the U. S. aircraft industry. Swissair was the first European airline to adopt a fast American transport when it bought the Lockheed Orion in 1932. Two years later it became one of Europe's first purchasers of the DC-2. The entire Swissair maintenance and overhaul set-up is based on the use of American equipment and tools; to switch to British standards would be extremely costly.

SWISSAIR DC-6Bs, Convair 240s and a DC-3 line up at Zurich Airport, airline's home base.

• **With a Pratt & Whitney-powered** fleet of six DC-6Bs, seven Convair 240s, three DC-4s and nine DC-3s, Swissair finds that it is well equipped to take care of present requirements. On order are four DC-7Cs which are to be delivered in November 1956 and December, June and August of 1957. In order to familiarize itself with the Wright turbo compound the company will receive one of these powerplants in March 1956. It will probably cost about $500,000 to adapt Swissair's new engine shop at Zurich airport to overhauling the Wright powerplant.

At the moment Swissair's engines have the following overhaul times: R-2800s, 1,250 hours (1,100 hours for those used on the Convairs); R-2000s, 1,400 hours; and R-1830s, 1,200 hours. Progressive maintenance in the company's splendidly-equipped shops is used for the DC-6Bs and Convairs, and this summer each DC-6B has been getting a daily utilization of 11½ hours and each Convair seven hours.

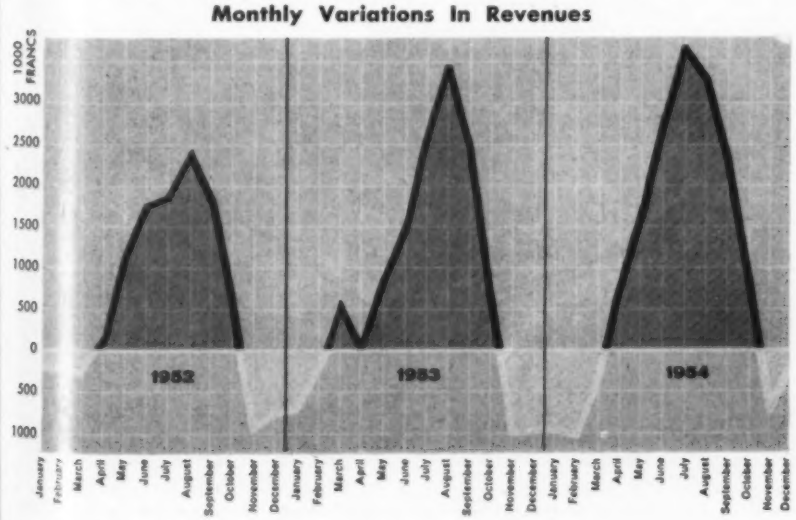
Naturally Swissair is eagerly awaiting the arrival of the DC-7Cs, which company engineers estimate will enable all eastbound flights to be operated nonstop between New York and Switzerland throughout the year. Westbound it looks as though wind conditions at certain times of the year will require about 30% of all flights to make an intermediate landing.

• **After the DC-7C,** the DC-8 would be a logical choice for Swissair in view of the company's past loyalty to Douglas equipment. It would also seem that 1961 would be a logical date for the introduction of this aircraft into service, since in the past there has always been a five-year period between the start of operations by new long-haul aircraft of the airline.

Swissair introduced the DC-4 in 1946 and the DC-6B in 1951. The DC-7C should go into service in 1956; therefore the DC-8, if ordered, might well start flying on Swissair routes in 1961. The company has already built a test cell for jet engines, incidentally.

Apart from a jet transport, Swissair may soon have a requirement for all-cargo aircraft to replace the DC-3 and DC-4 planes currently used. The company's cargo traffic has been growing very fast recently. It was 37% greater in the first half of this year than in the like period of 1954. Swissair is one of the few carriers to operate a scheduled all-cargo service to New York and at the moment is getting ex-

Monthly Variations In Revenues



cellent loads (personal planes are regular cargo on eastbound flights).

• **Air cargo** is particularly attractive for shippers to Switzerland, since the Swiss customs charge duty on weight including the packing, which is obviously lighter with air transport than with surface conveyance. Main eastbound commodities are textiles, electrical equipment, chemicals and pharmaceutical items. Westbound, watches came first, followed by textiles, straw products, chemicals, pharmaceutical products, machines and precision instruments.

Passengers on Swissair are almost as varied as the freight carried by the airline, and the company prides itself on the linguistic ability of its personnel of 3,000. The Swiss, of course, are good at languages, with four different tongues spoken in different parts of the country.

Another pride of Swissair is the cabin service, which is in the highest tradition of a nation that is tops in the hotel and restaurant field. By associating Swiss precision and service with a modern fleet of U. S. aircraft, Swissair has a combination which is as attractive to the passenger as it is to the stockholder. • • •

MATS Tests Brighten Turboprop Picture

- **YC-131C performs beyond expectations in first 1,000 hours.**
- **Airline operations of six test aircraft now dead issue.**

By JOSEPH S. MURPHY

SAN ANTONIO, TEX.—Air Force's turboprop engine evaluation program, being spearheaded here at Kelly Air Force Base by Military Air Transport Service's 1700th Test Squadron, is showing first signs that the prop-jet combination may have a solid future as a powerplant for military transports.

Possibility of airline operation of the six test aircraft is now a dead issue, MATS officials told AMERICAN AVIATION in an exclusive interview. As a result, MATS has now geared its organization to carry the program to its completion.

First aircraft in the project—two Convair YC-131Cs powered by prototype Allison YT56 engines and Aeroproducts propellers—have hurdled the 1,000-hour flight mark on their way to a 3,000-hour goal by January 31, 1956.

• **Two other types,** Boeing YC-97Js fitted with Pratt & Whitney T34 engines and Curtiss propellers, and Lockheed YC-121Fs using T34s with Hamilton Standard propellers, will be in operation before the year end.

If the current favor for the turboprop that now abounds among MATS personnel on the YC-131C project continues throughout the program, there should be little doubt as to its future with the military.

Performance of the twin turboprop in flights to date has been "far beyond expectations," Col. Claude W. Smith, commander of the 1700 Air Transport Group, reports. Smith says the reaction of MATS pilots has been 100% favorable, commenting, "We haven't had a dissatisfied customer yet."

• **Among the newer** and stronger AF turboprop enthusiasts is Brig. Gen. Brooke E. Allen, former USAF director of information services, who now commands MATS' Continental Division.

Since assuming his new post in April, Allen has been checked out on the YC-131C and has flown the turboprop nearly 30 hours. His three-word appraisal: "I love it."

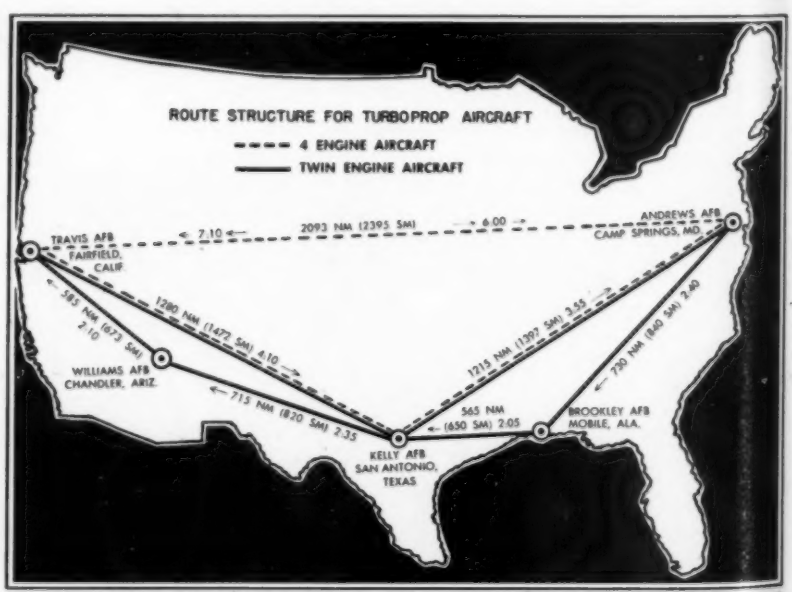
Allen was pilot in command of a nonstop YC-131C flight from Andrews AFB, Md. to San Antonio with this writer aboard. From takeoff at 2 p. m. EDT time until touchdown at Kelly AFB exactly five hours later, the turboprop covered the 1,248 nautical mile span at an average speed of 249 knots (287 mph).

As to progress of the YC-131C program, although nearly one-third of scheduled flying is already completed, MATS' operation is only now moving into high gear. After a slow start, hampered mostly by a short supply of Allison YT56 engines, utilization has been climbing steadily since May.

Based on actual engine availability for operations, daily aircraft utility between January and April hung below the four-hour mark. In May it jumped to 6.2 hours, in June to 7.6 hours, and the final figure for July was expected to surpass eight hours.

• **"We're out of the woods** on engine down time," Col. Smith says, indicating little doubt that MATS would better its 3,000-hour commitment by January 31. Original allocation of eight YT56s (including four installed in aircraft) has been raised first to 12, then later to 20 engines, he explains.

This added engine availability, coupled with virtually trouble-free operation of airframe, engines and pro-



MATS PLAN FOR TURBOPROP flying shown here links Travis AFB on West Coast with Andrews AFB, Md. by nonstop YC-97J and YC-121F flights. Home base is Kelly AFB, Tex.

pellers, is bound to permit MATS to record higher utilization factors in the months to come.

Evidence of the high engine reliability is borne out by the fact that, although basically a 50-hour-life-prototype, the YT56 operation at 100-hour intervals was so successful that the overhaul time was raised to 150 hours in June. Now MATS officials are weighing further extension, this time to 200 hours.

• **Engine maintenance** demands between periodic checks have been practically nil, Smith says. He describes a routine monthly report of component parts replacements on the YC-131C as becoming little more than a listing of nuts, bolts and AN hardware.

Only major engine replacement now required between overhauls is a scheduled 50-hour combustion liner change, a practice not anticipated in a production T56. MATS expects its first engines with new long-life liners this month, another factor that will contribute to reduced engine down time.

Boxscore of engines replaced to date shows that of a total 27 removed, 19 have been scheduled time changes and eight were "failures." This term is hardly considered fair to the YT56, however, in that three removals were caused by items not classed as engine parts. Two others were found to be troubles of a repairable nature that would not necessitate complete overhaul.

Of the three "non-engine" troubles, two were due to foreign objects entering the air intake, resulting in damaged compressors. Although this is generally accepted as common occurrence on military jets, it should be classed as a rarity on the YC-131C installation where the air intake is located above the propeller shaft.

NEWEST AF TURBOPROP supporter is Brig. Gen. Brooke E. Allen (left), who now commands MATS' Continental Division. Allen is shown with Col. Claude W. Smith, who heads turboprop project.

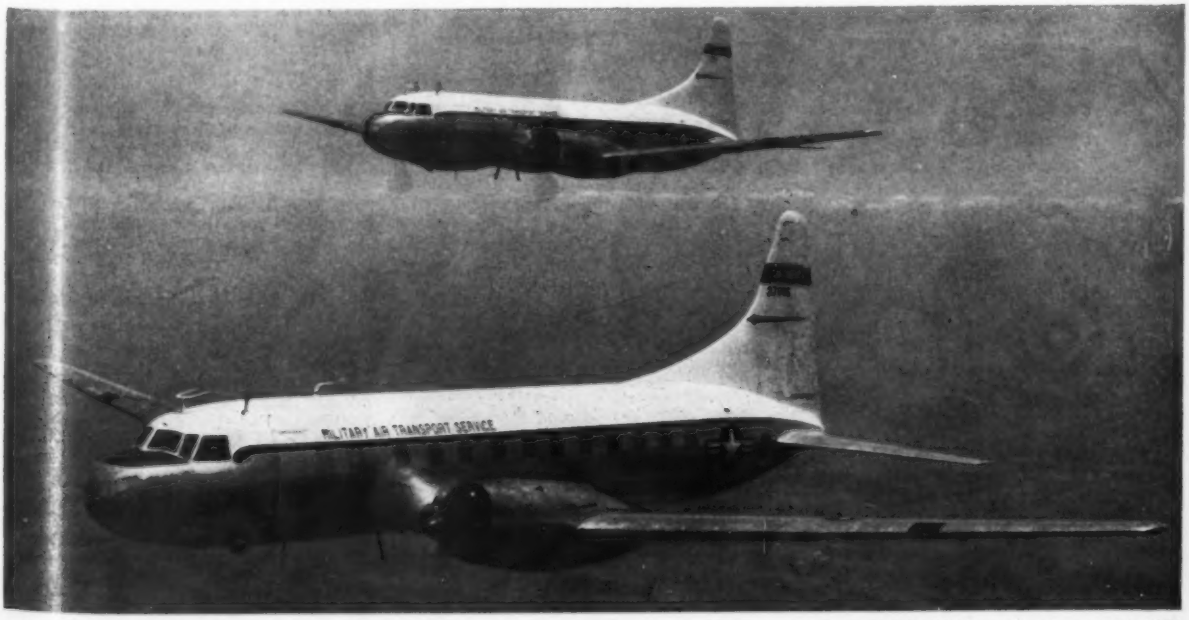
None of the engine removal causes experienced on the prototype "Y" series turboprops is considered of a type that would exist on production T56s.

MATS' experience with Aeroproducts Model 198 propellers on the Convairs has been equally successful. Only two premature changes have been recorded to date and neither has involved the basic propeller blade and hub system.

• **As with the YT56** engine, propeller change periods have been on the rise. Although overhaul is currently being scheduled at 300 hours, MATS is now considering increase to 600 hours. More advanced Model 198A propellers are expected to be installed later this year to give the YC-131C such features as propeller anti-icing/de-icing and a negative torque signal system instead of present automatic feathering.

All of these factors have combined to permit higher than programmed utilization on the YC-131Cs since May 1. As of July 31 actual flying was 397 hours in excess of schedule, equivalent to more than 30 days ahead of the planned program.

Next big change in operation will take place between October and Janu-



YC-131Cs IN FORMATION. Two test turboprops have passed the 1,000-hour mark. MATS expects to exceed 3,000 hours by January 31, 1956.

ary when MATS is scheduling 472 hours monthly flying for the two aircraft, but hopes to hike daily utility above ten hours. If realized, the two Convairs would amass 2,400 flying hours in the last four months of operation alone.

• **One important assignment** in the test project is the development of an operational doctrine for turboprop aircraft. Experience with the YC-131C until now, MATS officials feel, indicates turboprops will simplify rather than complicate such problems as air traffic control, terminal area holding patterns and even airport ground operations.

Reason is that its wide range of available power assures high rates of climb and descent that will move aircraft out of and into airports more rapidly than possible with present piston engine types. Elimination of pre-takeoff ground power checks will likewise speed airport ground operations.

Big selling feature of the YC-131 among MATS pilots is the simplicity of its operation. Instead of the myriad of engine controls in the conventional 340 (throttle, propeller, mixture, carburetor heat, etc.) the C-131 has only two—a power lever and a propeller condition lever.

• **Movement of the power** lever controls both engine and propeller operation from full reverse prop operation through "Ground Idle" and "Flight Idle" positions to "Takeoff" power. As a safety feature, the power lever has a lift-type arrangement that prevents movement below the "Flight Idle" range to protect against inadvertent reversal of propellers.

Role of the condition lever is to provide for such operations as airstarts, and for engine fuel shut-off, both electrically and mechanically, in event of propeller feathering.

As to the aircraft's operational flexibility, Smith cites one experience to date when the so-called short-range YC-131 flew for 8:05 hours and landed with 45 minutes' fuel remaining. Carrying 1,730 gallons on departure, the aircraft spent one hour at 25,000 ft., six hours at 22,000 ft. and 1:15 hours in climb and descent.

• **Highest utilization** for a YC-131C during a single 24-hour period has hit 19 hours, 35 minutes. Over a three-day span, one aircraft flew 44 hours, 20 minutes for an average daily utility of 14 hours, 46 minutes.

Although no firm plan has been set, MATS officials are beginning to ponder the disposition of the twin turboprops when they reach their January 31 cut-off date.

Recommendation that will probably be forthcoming from MATS officials here is that they be converted for all-weather flying, fitted with production T56s, soundproofed, and then reverted to a standard MATS transport mission.

And if the four-engine aircraft tests prove as successful as that of the Convairs, a similar recommendation would no doubt be forthcoming for their continued operation. This, however, remains to be seen, as the start of their test operation is still several months off.

• **Present schedule** calls for delivery of both Boeing YC-97Js to Edwards AFB for accelerated flight safety testing sometime this month. Assuming no unusual delays, they will be turned over to MATS early in September.

The Lockheed YC-121F delivery follows several months later. First airplane is due at Edwards AFB on October 14 and the second on November 30. After a 21- to 30-day stay for safety flight test at Edwards, deliveries to MATS won't take place until mid-November and late December respectively.

With all three aircraft in operation, MATS plans an "airline-type" operation between east and west coast bases (see map) with Kelly AFB serving as main operating and maintenance headquarters. By the end of the complete program, which calls for a minimum of 4,150 hours on C-97s and 3,500 hours on C-121s, MATS will have amassed close to 12,000 flying hours on six turboprop powered aircraft.

To MATS' Col. Smith, this wealth of experience, particularly by reason of the "open book" manner in which it is being relayed to industry, represents one big contribution to the field of turbine powered aircraft. Ever since the project got underway, the 1700th Test Squadron has been supplying a comprehensive monthly progress report to interested airline, CAA and aircraft manufacturing officials. • • •

YC-131C Statistics

Since receipt of the two turboprop-powered Convairs in late January, MATS' 1700th Test Squadron has compiled this statistical record of flying through June 30:

Total Hours Flown	849:35
Total Fuel Consumption	250,364 gals.
Avg. fuel/engine flight hour	148 gals.
Total Oil Consumption	317 gals.
Avg. oil/engine flight hour	1 pint
No. of landings	551
No. of engine reversals	1100
Total propeller featherings	58*

**Note: All except two propeller featherings were for training or test flight purposes.*

CAB NEWS

Pending Cases

Hearings in the **New York-Florida Case,** which opened in Washington in early June, are still in progress with conclusion anticipated either late this month or early next.

An Examiner's report is due momentarily in the north-south phase of the **All-Freight Renewal Case** in which U.S. Airlines seeks renewal of its all-cargo certificate and in which Riddle Airlines and American Air Export & Import Co. are leading applicants to succeed U.S. if the latter's certificate is not renewed.

Now that **CAB** has settled, temporarily at least, the States-Alaska Case, it has turned its attention to the long-standing **Intra-Alaska Investigation** which deals with certificated operations within the Territory with emphasis on possible mergers and route alignments. Case gets underway September 8 with a prehearing conference in Washington.

CAB Calendar

Sept. 7—Oral argument, Trans-Texas Renewal Case. Washington, D. C. Dockets 6485 and 7190.

Sept. 8—Prehearing conference, Intra-Alaska Route Investigation. Washington, D. C. Docket 6093.

Sept. 12—Hearing, Erie-Detroit Service Case. Washington, D. C. Docket 6927 et al.

Sept. 19—Hearing, Houston-West Coast Interchange Case. Washington, D. C. Dockets 6597 and 6749.

Oct. 3—Hearing, New York-Nassau Case. Washington, D. C. Docket 6685 et al.

Nov. 1—Hearing, International Service Mail Rate Case. Washington, D. C. Docket 6630 et al.

CAB Decisions

Delta-C&S Air Lines turned down on bid to serve Fort Wayne, Ind. as the junction point for routes of the merged carrier.

Trans World Airlines request to have $3 million tax reserve declared immune from offset action in Transatlantic Mail Rate Case turned down by 3-2 vote with Members Gurney and Denny dissenting.

Proposals of **Eastern Air Lines** and others to expand the Houston-West Coast Interchange Case into a southern transcontinental route proceeding denied by 4-1 vote with Member Lee dissenting. **American, Braniff, Continental, Delta, National, TWA** and **Western** opposed expansion.

Recent CAB Applications

Pan American World Airways applied for new south Atlantic segment from San Juan, P. R. to The Azores and beyond; also addition of Madrid to present and proposed South Atlantic routes.

National Airlines has applied to include Fort Lauderdale, Fla. as an intermediate between West Palm Beach and Miami.

Mohawk Airlines has applied for an exemption to operate nonstop between Syracuse and New York City.

Southern Airways asked CAB for a route extension from Monroe, La. to Houston via Alexandria, Lake Charles, and Beaumont-Port Arthur.

Airline Commentary

By Eric Bramley

This month we welcome Piedmont Airlines to Washington, D. C. It was probably the quietest entry ever made by a local service line into a major market. Few people even realized that the company had an application on file for Lynchburg-Charlottesville-Washington. No one opposed it at CAB's hearing, no one took exception to the examiner's report, and all of a sudden Piedmont's in Washington. We extend a warm welcome to the 10th passenger-carrying airline to serve the Capital.

* *

Well sir, a few issues ago we asked: which U.S. airline is the oldest? Western Air Lines says it is (29), United says it's 30, and TWA is marking "30 years of service." Two answers to the question have been received. Dick Rummel, UAL's publicity director, says UAL stands on the record—it led them all on incorporation (National Air Transport, May 21, 1925) and start of operation (Varney, Apr. 6, 1926).

Not so, says Bert Lynn, WAL's advertising and pubrel director. After reading our column he issued a press release and wrote us, asserting that this business of going back to predecessor companies is "hokum" and that UAL and TWA are foisting a "hoax" on the public. WAL is oldest—opened service Apr. 17, 1926, has operated continuously since (name changed from Western Air Express in 1941), he states. Of the others, he says UAL is 24—formed in 1931 as operating subsidiary of United Aircraft & Transport Corp. "Until 1931 there was no United Air Lines." TWA is 24—formed by agreement signed by Western Air Express, Transcontinental Air Transport, and Pittsburgh Aviation Industries on July 16, 1930, and approved Feb. 13, 1931. He concedes TWA may be able to claim Oct. 25, 1930, the date it opened service, as its inaugural date. We haven't heard from TWA. So there the matter stands, for now.

* *

Folks at Eastern Air Lines tell the story about the company's new DC-7B Golden Falcon: During the planning of the interior, Capt. Eddie Rickenbacker said he'd had enough of wrestling with handles on the doors of airplane washrooms. On this plane, he ruled, the door will open "just like the door in your bathroom at home." Result: the DC-7B has a plain, everyday doorknob on the washroom.

Sales, Traffic, Promotion

Los Angeles Airways received interesting answers from questionnaires distributed to passengers recently. It learned that 65 passengers found out about the helicopter service from newspaper ads, 40 from other airlines, 30 from travel agents (only seven from radio). First-riders on a helicopter totaled 136; 25 had ridden before. Only one person said he didn't enjoy the trip, although a couple answered "yes and no" and one "fairly." Business travelers numbered 97, pleasure 73, emergency 14. If helicopter service hadn't been available, a great majority of passengers would have traveled by car. Most of them were connecting with other airlines . . .

People flying to New York can now obtain reservations for New York Yankees baseball games through any American Airlines ticket office or local travel agency. AA says the new service is "unprecedented in the history of the travel industry." Office or agency issues a special "ticket" to the passenger which is exchanged for a regular ticket at Yankee Stadium or Yankees' downtown New York office . . .

Ed Bern, vice president-sales of Panagra, has been using a new promotion in connection with the company's recently-inaugurated DC-7B service. He mailed a letter to reservations managers of other airlines, travel agents, etc., stating, "you'll always bring home the bacon when you sell Panagra." Attached to each letter is a certificate good for one pound of bacon at any A&P store . . .

Delta-C&S Air Lines now has "Kwik Kennels" available for carrying pets—on international flights only. There's a $10 rental fee for the kennel plus regular excess baggage rate according to weight . . .

Allegheny Airlines has mailed 1,000 half-pound boxes of salt water taffy to employes of trunk carriers to remind them that it serves Atlantic City . . . Braniff Airways has started a program of giving special citations to hostesses for "consistent, outstanding, friendly in-flight service." Winners receive a special new hostess wing, bearing a diamond and a star. . .

Pan American World Airways' Pacific-Alaska Division is installing new filters on its Stratocruisers to assure that pleasant-tasting drinking water is available to passengers. This has long been a problem for PAA in the Pacific, because it has to obtain water from many different areas. Filters are being installed at forward drinking fountain, galley and bar. They add 25 lbs. weight, are replaced every four months. But they'll save $10,000 yearly in man-hours of service (before installation, flushing and disinfecting plane's water system required 260 man-hours monthly; another 160 man-hours were spent checking out planes written up on discrepancy reports). In addition to filtering, PAA will use chlorine tablets in the water aboard. Filter system is made by Tested Appliance Co., Chicago. . .

Sabena Belgian World Airlines states that it's now offering passengers three meal choices—for example, fish, meat or chicken. Also, special meals for children (lunch box also contains cubes, puzzles, cardboard games, etc.) . . .

Billboard advertising is being used by Ozark Air Lines in 11 of its cities, under CAB's program which allows local service lines to exchange transportation for advertising. Ozark's billboard campaign is aimed at diverting traffic from the highways.

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Undisplayed Advertising: $1.00 per line, minimum charge $4.00. Cash with order. Estimate 30 capital letters and spaces per line; 40 small lower-case letters and spaces per line. Add two lines if Box Number is included in lieu of advertiser's name and address. **Displayed Advertising:** $15.00 per column inch. Space units up to full pages accepted in this section for classified-type advertising. Forms close three weeks preceding date of issue. Address all correspondence to Classified Advertising Department, American Aviation Publications, 1025 Vermont Ave., N. W., Washington 5, D. C.

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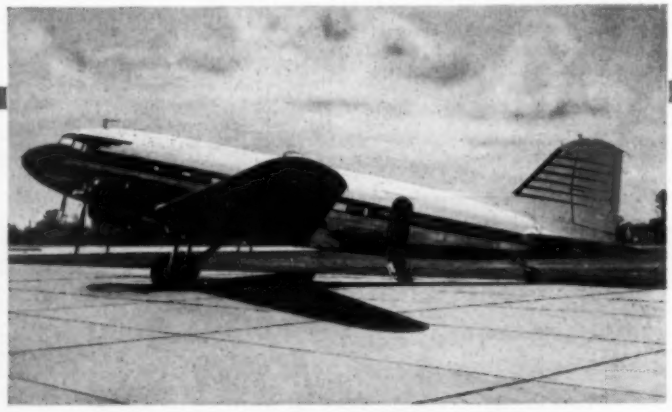

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Our congratulations to the Sun Oil Company and the pilot of its DC-3, Capt. Ray Higgins, winners of the enviable Reading Aviation Awards for the Best Exterior and the Best of Class for Multi-Engine Aircraft over 12,000 lbs.

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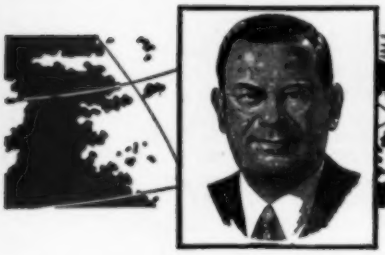

EN ROUTE . . .

WAYNE W. PARRISH

Three vignettes from a recent trip to Germany with Lufthansa, the German airlines.

I—Wholesale Death

Less than two months after the end of the European war in 1945, I joined a group of aviation writers for an Air Force tour of the bombed German cities. Our first stop was Hamburg. I was appalled at the vast destruction.

On a warm July day a group of us went into town to see the extent of the ruins. I left the gang and walked down a street whose name became indelibly burned into my mind—Eiffestrasse. Once it had been a busy street lined with four and five-story apartment houses with shops on the street level. One night a big fleet of bombers had flown overhead and rained death and destruction on the area.

The rubble had poured out over the sidewalks into the street. Sidestreets were blocked. At one intersection I turned in all four directions and my eyes couldn't spot a single undamaged structure anywhere. It was the most colossal leveling I had ever seen. It was a ghost area. It was deathly quiet, and indeed there were unknown hundreds and thousands still buried in the ruins. The only sound was the senseless chirping of sparrows. Occasionally a German bicycled down the open lane between the mass of rubble.

During the intervening ten years I often wondered what had happened along Eiffestrasse. So in June this summer I was in downtown Hamburg again and I got Ernie Hakansson, the SAS manager, to find out where the street was and to drive me out there. We found it easily, just southeast of the center of the city. It runs about a mile east and west.

The area is cleared up now. Mostly vacant lots. A few temporary buildings have been erected here and there and around the fringes there are some new apartment buildings and others have been patched up. But a wide area remains completely wiped out. The sidewalks and streets have been cleared up and the rubble hauled away. Those who see it for the first time today can only barely imagine what it looked like in 1945. Traffic now moves along Eiffestrasse and eventually the area will be rebuilt, but the memory of that ghostly quiet with only sparrows chirping in the mid-day sun will remain with me always.

II—No Man's Land

That little strip of freshly-raked earth, a ribbon only 15 or 20 feet wide scarred out of the undulating fields in each direction, looked so unimposing and innocent. Yet it was one of the most treacherous and meaningful strips of land on the globe today.

Fifty miles northeast of Hamburg is a very ancient town of Lubeck, once one of the headquarters of the Hanseatic League that flourished in the Baltic and North Sea centuries ago. It's a picturesque port inland from the Baltic and connected with Hamburg by one of the famous German autobahns, or expressways. If you drive beyond Lubeck you reach the seacoast resort area of Travemonde, and you look across the bay a mile away to the Russian zone.

On the way to Travemonde Ernie Hakansson forked off to take a small treelined road eastward into farm country. There was almost no traffic and the road seemed to be little used as we drove along. Then suddenly we reached a red-and-white barricade with a weather-beaten sign warning that we had reached the end of the British (western) zone and the Russian zone lay ahead.

Just beyond the barrier the road had been broken up and replaced by the strip of freshly-raked earth, a no man's land for sure. Beyond that the road continued beneath the trees, but grass had all but obscured the pavement. It was a warm Sunday morning. Not a soul was to be seen. It was very quiet. But if we had walked across that strip of earth (which is raked to detect any crossings), then what? The price would have been imprisonment or something of the sort. Where we stood was freedom. Where we looked just 20 feet away was decay, hatred, and plenty of trouble.

It was all quite unreal. So pleasant were the surroundings that it was difficult to believe that suddenly we had come up against the real Iron Curtain, that this little strip of earth divided two ideologies and two ways of living. We turned our car around and went on to Travemonde where Germans were sunning themselves, drinking beer, and enjoying freedom of thought and action. It gave me a little chill to have come so close, just a hop, skip and jump, to the decadence of suspicion, hate, and iron terror.

III—Sex for Sale

It was late at night in Hamburg and Ernie and I had finished our round of night life and drove a few blocks through back streets until we reached an area where a few small cafes were open and then we parked the car. We entered a tiny street, about the width of two cars, and approached a big steel barrier about eight feet high which stretched over most of the street. On the barrier was a sign warning that the area behind was off limits to military personnel.

We went around the barrier and saw before us Hamburg's own conception of regulated prostitution. Lining the sidewalks were small, old town houses, the picturesque types which are built up to the sidewalks and which are to be found in every old city of Europe.

But these were different. The fronts of the brick houses had been torn out and replaced with well-lighted show windows. At a distance, what with the old-fashioned street lights and the bay windows, it might have been a Hollywood stage setting for a movie based on the time of Dickens, except that the electric lights provided more light than the gas-light era.

But seated in the windows were girls—women, really, for I spotted almost no young ones—most of whom were dressed in evening gowns. They were on display to be purchased for a few moments of pleasure for a rate of ten to twelve German Marks ($2.50 to $3.00). There were about four or five chairs in each window and the number of vacant chairs indicated business was fairly brisk. About twenty or thirty men were walking up and down the sidewalks looking over the merchandise. Some, like Ernie and me, were merely curious sightseers.

If you wanted to converse with one of the gals she opened a little window panel. But the women are not permitted to come out into the street to solicit. Nor do prospective customers have to go into a house—as in most areas of the world—and buy drinks or otherwise get involved. It is all very orderly, and considering everything, quite dignified.

There are three such enclosures in Hamburg, operated and regulated by the city. They are open 24 hours a day, so the women work in shifts. Most of the women had the customary bored, hard look, and only a few took any initiative in soliciting customers. I pass no judgment on what is known as the world's oldest profession, but the city fathers of Hamburg have at least given it a new look and put it on well-lighted display.

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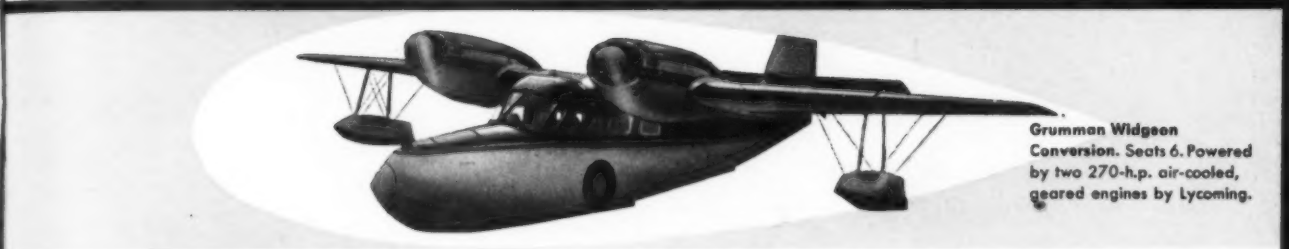

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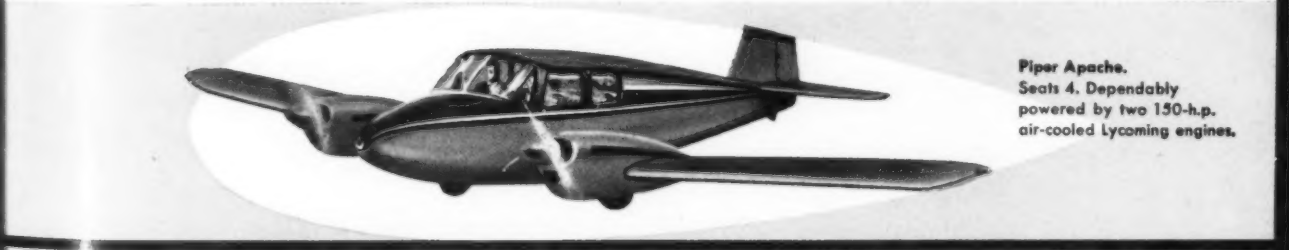

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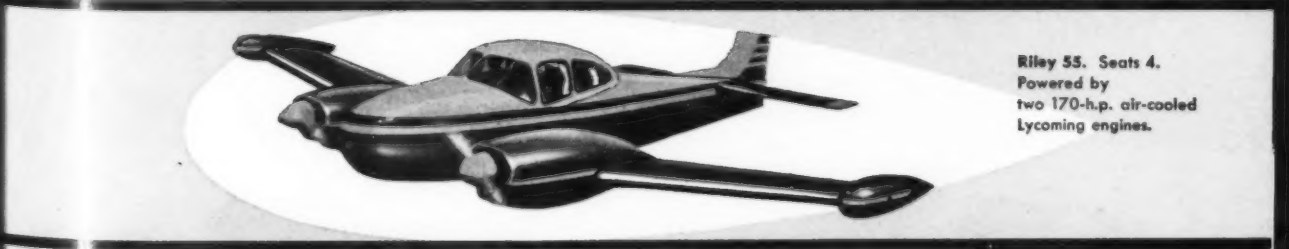
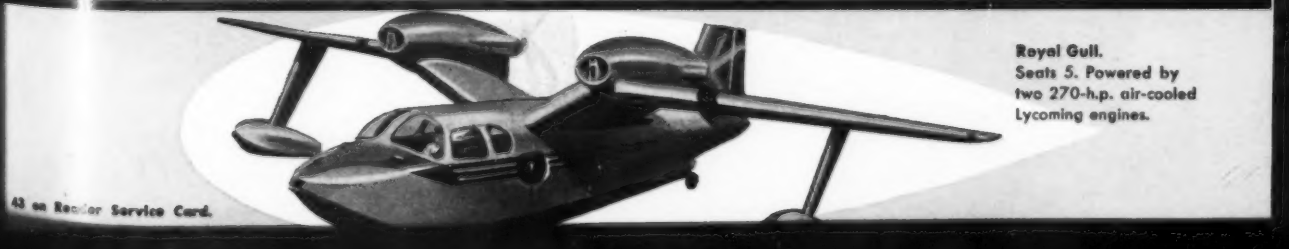


Riley 55. Seats 4. Powered by two 170-h.p. air-cooled Lycoming engines.



Royal Gull.
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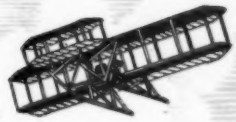

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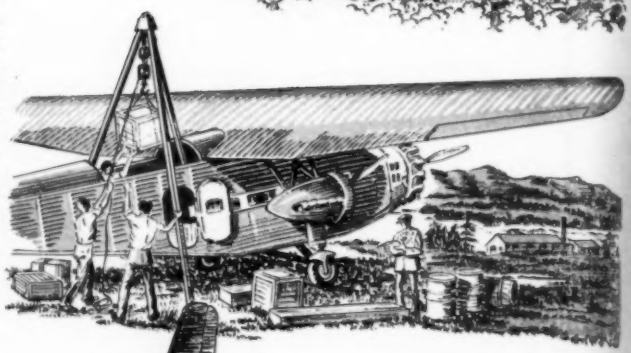

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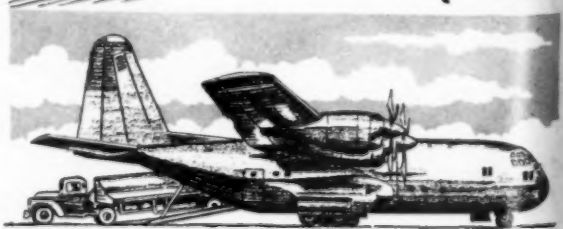

The Lockheed C-130 *Hercules* turbo-prop military cargo transport carries a 40,000 pound payload and can accommodate a bulldozer, a tank, tractor-trailer or other bulky loads.

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